DOCUMENT RESUME

ED 406 919 HE 030 093

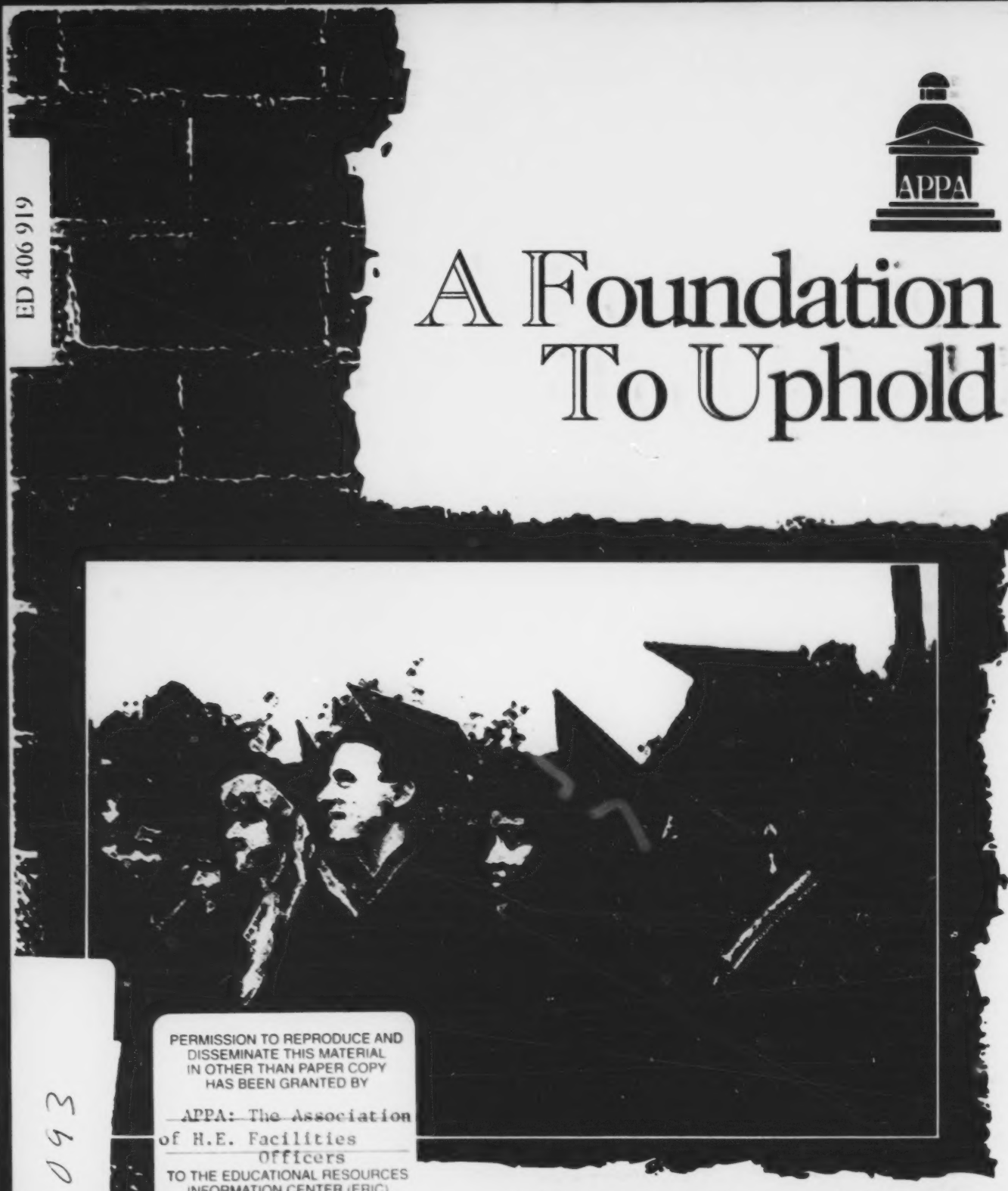
AUTHOR	Kaiser, Harvey H.; Davis, Jerry S.
TITLE	A Foundation To Uphold: A Study of Facilities Conditions at U.S. Colleges and Universities.
INSTITUTION	APPA: Association of Higher Education Facilities Officers, Alexandria, VA.; National Association of Coll. and Univ. Business Officers, Washington, D.C.; Student Loan Marketing Association, Washington, D.C.
REPORT NO	ISBN-0-913359-96-3
PUB DATE	96
NOTE	199p.
AVAILABLE FROM	APPA: Association of Higher Education Facilities Officers, 1643 Prince Street, Alexandria, VA 22314-2818 ($50 plus $8 shipping & handling).
PUB TYPE	Reports - Evaluative (142) -- Tests/Questionnaires (160)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Building Operation; College Administration; Decision Making; *Educational Facilities; Educational Policy; *Financial Needs; Financial Problems; Government Role; *Higher Education; National Surveys; Resource Allocation; *School Maintenance; State Government; Trend Analysis
IDENTIFIERS	*Deferred Maintenance

ABSTRACT

This report presents the results of a study of the condition of higher education facilities in the United States and offers recommendations to improve the deteriorating state of such facilities. The 1995 survey examined statistical, financial, and operational data gathered through mailed questionnaires returned by 400 institutions. The results indicated that there is an estimated $26 billion in total costs to eliminate accumulated deferred maintenance, of which $5.7 billion are urgent needs. While many campuses have made progress in reducing deferred maintenance, there was an overall increase nationally since the survey's baseline year of 1988. It was found that institutions typically had very little or very much accumulated deferred maintenance, and that public institutions usually had more deferred maintenance than private institutions. The report concludes that this large amount of deferred maintenance represents a threat to the ability of institutions of higher education to fulfill their missions, and that statewide agencies and individual institutions will have to make difficult choices for resource allocation. Three appendixes provide the survey research report, copies of the survey instruments, and a list of survey respondents. (MDM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 406 919



A Foundation To Uphold

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN OTHER THAN PAPER COPY HAS BEEN GRANTED BY

APPA: The Association of H.E. Facilities Officers

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

IAE 030 093

A Study of Facilities Conditions at U.S. Colleges and Universities

A collaboration of:
APPA: The Association of Higher Education Facilities Officers
The National Association of College and University Business Officers
Sallie Mae

BEST COPY AVAILABLE

A Foundation To Uphold

A Study of Facilities Conditions at U.S. Colleges and Universities

Written by

Harvey H. Kaiser

Research Report by

Jerry S. Davis

A collaboration effort by:

APPA: The Association of Higher Education Facilities Officers

The National Association of College and University Business Officers

Sallie Mae

Published by

APPA

A Foundation to Uphold

Entire contents are © 1996 by APPA: The Association of Higher Education Facilities Officers. The Survey Research Report is © 1996 by Sallie Mae. All rights reserved.

Except as permitted by current copyright laws, no part of this publication may be reproduced, distributed, or transmitted in any form or by any means without the prior written permission of APPA.

Printed in the United States of America.

International Standard Book Number: 0-913359-96-3

Cover design: David Zinn, The AD Group
Interior design, figures, and production: Bob Rand, Edington-Rand, Inc.
Printing: Eric Wiemann, Graphic Resources, Inc.

APPA: The Association of
Higher Education Facilities Officers
1643 Prince Street
Alexandria, Virginia 22314-2818
http://www.appa.org

Contents

List of Figures vii

List of Tables ix

Acknowledgments xi

Executive Summary: A Foundation to Uphold 1
- Accumulated Deferred Maintenance 2
- Factors Beneficial to Addressing Deferred Maintenance 2
- Conclusions 4
  - 1. A Foundation to Uphold 4
  - 2. Sustained Institutional Commitment to Action 4
  - 3. Roles and Responsibilities of the Higher Education Community 5
  - 4. Facilities Prepared for the 21st Century 6
- Final Note 6

1. A Foundation to Uphold 9
- An Academical Village 10
- Campuses Today 11
- Audiences 13
- The 1995 Survey 14
- Survey Report Limitations 15
- Terminology 15

2. The Condition of Higher Education Facilities 19
- Survey Data and Findings 19
  - Number of Institutions 20
  - Enrollments 22
  - Employees 23
- Space 25
  - Age of Facilities 28
  - Building Size 29
- Construction and Renovation 30
  - Building Pace Continues 30
  - Costs and Priorities by Facilities Types 31
  - Sources of Funds 32
  - Americans with Disabilities Act (ADA) 32

3. Accumulated Deferred Maintenance **37**
Costs of Eliminating Deferred Maintenance 37
Deferred Maintenance by Sector and College Type 39
Deferred Maintenance by Facilities Type 40
Changes in Accumulated Deferred Maintenance Since 1988 40
Dollars Spent on Deferred Maintenance in 1994 41
Deferred Maintenance Financial Benchmarks 43
Facilities Condition Index 43
Deferred Maintenance Ratio 45
Actions to Reduce Deferred Maintenance 46
Strategic Planning 47
Increased Facility Funds 47
Earmarked Budget 48
Delaying or Canceling New Construction 48
Maintenance Endowments 48
Factors Beneficial to Addressing Deferred Maintenance 48
Deferred Maintenance at Historically Black Colleges And Universities 49

4. Conclusions **53**
1. A Foundation to Uphold 53
2. The Effects of Deferred Maintenance on Higher Education 54
3. Interdependent Policy and Decision-Making Roles and Responsibilities 55
4. Institutional Commitment To Action: Strategic Facilities Planning 57
5. Financial and Facilities Management 59
6. Leadership for a Diversity of Institutions 60
7. Dependable Funding Sources for Capital Reinvestment 61
8. The Role Of Data Collection in the Capital Decision-Making Process 62
9. Space and Cyberspace 63
Final Note 64

APPENDIX A: The Survey Research Report

I. Introduction **69**
The Study Background 69
The Study Purposes and Methodology 70
How Respondents Differed From Non-Respondents 74
How the Study Data Are Reported 76

II. The Growing American College Physical Plant **85**
Campus Sizes and Facility Uses 88
Renovations on College Campuses 92
Summary and Conclusions 94

III. Construction and Renovation on College and University Campuses **97**
Current Construction and Renovation Projects 97
Types of Facilities Being Constructed 101
Types of Facilities Being Renovated 101
Current Construction and Renovation Gross Square Footage 104
The Costs of Current Construction and Renovation 106
Future Construction and Renovation on College Campuses 109
Future Construction and Renovation Space and Expenditures 110
Paying for Construction and Renovation Costs 113
Top Construction and Renovation Priorities 115
Work on Top Construction and Renovation Priorities 118
Summary and Conclusions 120

IV. Accumulated Deferred Maintenance at Colleges and Universities **123**
How Accumulated Deferred Maintenance Is Assessed 123
How Accumulated Deferred Maintenance Has Changed 124
Costs of Eliminating Accumulated Deferred Maintenance 125
Urgent ADM Amounts 130
How ADM is Apportioned by Type of College Facility 131
Actions to Reduce Accumulated Deferred Maintenance 133
College Expenditures on Accumulated Deferred Maintenance 138
Summary and Conclusions 140

V. Colleges and the Americans with Disabilities Act **145**
Actions Taken to Comply with ADA 145
ADA Investigation and Enforcement Actions 147
College Expenditures on ADA Compliance 148
Dollars Needed to Achieve Full Compliance 149
Costs Per Student for ADA Compliance 152
Summary and Conclusions 155

VI. Study Summary and Conclusions **157**

APPENDIX B: Survey Instruments **163**

APPENDIX C: Survey Respondents **187**
Listing by Institution Type 187
Alphabetic Listing 191

List of Figures

	Estimated Cost to Eliminate Accumulated and Urgent Deferred Maintenance (ADM), by College Types	3
Figure 1	Growth in Number of Institutions, by Control and College Type: 1950–1994	21
Figure 2	Enrollments by Control and College Type: 1950–2005	22
Figure 3	Distribution of Students, By Size and Control, 1993	24
Figure 4	Total Faculty and Staff by Occupation, 1993	25
Figure 5	Total Faculty and Senior Instructional Staff, 1950–1995	26
Figure 6	Construction of Total Campus Space: 1950–1994	27
Figure 7	Average Campus Space by College Type: 1994	28
Figure 8	Allocation of Construction Expenditures, 1994	31
Figure 9	Mean Construction and Renovation Expenditures per Gross Square Foot, by College Types	31
Figure 10	Sources of Funds for Construction and Renovation, by Sector: 1994	33
Figure 11	Average Accumulated and Urgent Deferred Maintenance (ADM), by College Types: 1994	38
Figure 12	Total Funding Necessary to Eliminate Deferred Maintenance at the End of 1994–95, by College Type	39
Figure 13	Changes in Accumulated Deferred Maintenance Since 1988	41
Figure 14	Amounts Spent on Deferred Maintenance by College Type: 1993–1994	42
Figure 15	Facilities Condition Index, by College Type: 1994	44
Figure 16	Deferred Maintenance Ratio, by College Type, 1994	46
Figure II-1	Cumulative Percentages Of GSF Constructed By Decades, By College Types	87
Figure II-2	Total Space Assigned to Uses On All Campuses	92
Figure III-1	Sources of Funds for Construction and Renovation At Public and Private Four-Year Colleges	114
Figure III-2	Percentages of Colleges Identifying Top Priority Construction and Renovation Needs, By Facilities Categories	118
Figure IV-1	Percentages of Colleges With Various Levels of Accumulated Deferred Maintenance	131
Figure IV-2	Percentages of Colleges With Various Levels of Accumulated Deferred Maintenance	133
Figure V-1	Resources of All Colleges to ADA Compliance	147
Figure V-2	Estimated 1993–94 Expenditures For ADA Compliance, All Colleges	149
Figure V-3	Estimated Average Amounts Colleges Would Have to Spend To Achieve Compliance With The ADA	153
Figure V-4	Estimated Number of Years It Will Take Colleges To Achieve Compliance With The ADA	155

List of Tables

Table I-1	CRDM Survey Populations and Responses, By College Types	72
Table I-A	Average Total Fall Enrollment, Population and Respondents, By College Types, 1993–94	79
Table I-B	Total Expenditures, Total E&G Expenditures, and Total Revenue For Populations and Respondents, By College Types	80
Table I-C	Land, Building, and Equipment Values For The Populations and Respondents, By College Types	82
Table II-1	Percentage Of Gross Square Footage Of Campus Buildings Constructed In Recent Decades, By College Types	85
Table II-2	Average Gross Square Footage Per Building By Decades Constructed And College Types	88
Table II-3	Estimated Average And Aggregate Gross Square Footage Of Owned Facilities Space, By College Types	89
Table II-4	Estimated Aggregate Gross Square Footage Of Owned And Rented Facilities By College Types	90
Table II-5	Percentage Classification Of Gross Square Footage, By College Types	91
Table II-6	Percentages Of Total Gross Square Footage Renovated Since 1975, By College Types	93
Table III-1	Percentages Of Respondents Reporting Construction and Renovation Projects In Progress, By College Types	98
Table III-2	Average Current Replacement Value Of Buildings For Colleges Reporting Both Construction And Renovation, Some Construction, Some Renovation, And None, By College Types	99
Table III-3	Average Total Education And General Expenditures For Colleges Reporting Both Construction And Renovation, Some Construction, Some Renovation, And None, By College Types	100
Table III-4	Percentages Of Colleges Reporting Construction Of Facilities Types, By College Types	102
Table III-5	Percentages Of Colleges Reporting Renovation Of Facilities Types, By College Types	103
Table III-6	Amounts Of Gross Square Footage Under Construction And Renovation, By College Types	105
Table III-7	Dollars Spent On Construction And Renovation, By College Types	107
Table III-8	Mean Construction And Renovation Expenditures Per Gross Square Foot, By College Types	108
Table III-9	Percentages of Respondents Reporting Future Construction and Renovation Projects, Planned For 1995 and 1996, By College Types	110
Table III-10	Amounts Of Gross Square Footage Planned For Construction And Renovation In The Near Future, By College Types	111
Table III-11	Dollars To Be Spent On Construction And Renovation Planned For The Near Future, By College Types	112

Table III-12	Percentage Of Funds Used For Construction And Renovation by Source, By College Types	114
Table III-13	Respondents' Top Construction Priorities, By College Types	116
Table III-14	Respondents' Top Renovation Priorities, By College Types	117
Table III-15	Percentages of Colleges Constructing or Renovating Their Top Priority Projects, By College Types	119
Table III-16	Percentages of All Respondents With No Current Construction or Renovation On Their Top Priorities, By College Types And Facility Types	120
Table IV-1	How Accumulated Deferred Maintenance Has Changed Since 1988, By College Types	124
Table IV-2	Total Funding Necessary To Eliminate ADM At The End Of 1994–95, By College Types	126
Table IV-3	Estimated Average and Total ADM For All Colleges, By College Types	127
Table IV-4	Total ADM As A Percentage Of Current Funds Expenditures, By College Types	129
Table IV-5	Total ADM As A Percentage Of Total Replacement Value of Buildings, By College Types	130
Table IV-6	Percentages Of Total ADM Considered Urgent, By College Types	132
Table IV-7	Percentage Of Total Accumulated Deferred Maintenance By Types Of Facilities, By College Types	134
Table IV-8	Percentages Of Colleges Taking Various Steps To Address Accumulated Deferred Maintenance, By College Types	135
Table IV-9	Effects Of Five Actions On Accumulated Deferred Maintenance	136
Table IV-10	Percentage Of Respondents Identifying Situations As Beneficial To Handling Deferred Maintenance, By College Types	137
Table IV-11	Effects Of Beneficial Situations On Accumulated Deferred Maintenance	137
Table IV-12	Amounts Spent On Accumulated Deferred Maintenance In 1993–94, By College Types	139
Table IV-13	Percentage of Total Current Funds Expenditures Spent On ADM In 1993–94, By College Types	140
Table IV-A	Responses To "Do You Conduct Periodic Facilities Audits To Determine Deferred Maintenance Needs?" By College Types	143
Table IV-B	Frequency of Periodic Facilities Audits, By College Types	143
Table V-1	Responses To Passage Of Americans With Disabilities Act, By College Types	146
Table V-2	Percentages Of Colleges Named In An ADA Complaint Or Suit And/Or Subject To An ADA Investigation Or Enforcement Action, By College Types	148
Table V-3	Expenditures For ADA Compliance In 1993–94, By College Types	150
Table V-4	Estimated Total Costs Of Achieving Compliance With The ADA, By College Types	151
Table V-5	Estimated Average Per Student Costs Of Achieving Compliance With The ADA, By College Types	154

Acknowledgments

The publication of *A Foundation to Uphold* is the culmination of a dynamic partnership between three organizations, two primary authors, and many supporting individuals. We first wish to acknowledge the leadership of Wayne E. Leroy of APPA and Caspa L. Harris Jr. and James E. Morley Jr. of NACUBO, as well as the associations' respective boards of directors, for their recognition that the study of facilities conditions is an important component in our collective support of the missions of our colleges and universities.

Following the success of its publication in 1989 of *The Decaying American Campus: A Ticking Time Bomb*, APPA again took the lead in collecting and disseminating important survey data on the subject of deferred maintenance on our college campuses. We wish to thank staff members Steve Glazner, E. Lander Medlin, and Diana L. Tringali for their direction and coordination throughout this project.

As with *The Decaying American Campus* and so many other projects, NACUBO again proved to be an important partner to APPA on *A Foundation to Uphold*. Anne C. Gross of the NACUBO staff served on the project team and provided valuable insight and detail to the survey and final report alike. We thank her for her tremendous contributions to this project.

The backbone of this report is the intensive research effort and project coordination put forth by the staff at Sallie Mae and its investment banking subsidiary, Education Securities, Inc. The data collection survey and its methodology were improved and expanded from what we had done for *The Decaying American Campus*, thus providing us with better data and greater confidence in our findings and conclusions.

We wish to acknowledge the following Sallie Mae and Education Securities staff members for their contributions to the project. John W. Gibb, long-time APPA and NACUBO supporter, provided the motivation

behind Sallie Mae and ESI participation. Thomas Buffoni and Karl Robb assembled and mailed the 2,000 survey instruments. Ray Bem, Cindy Buchanan, and Lynda del Castillo collected, processed, and helped analyze the mail and telephone survey data. Two individuals require special recognition. Wayne Willoughby of ESI pushed, prodded, and cajoled the project throughout its life, and he also suggested the title for this publication. The project benefited from the hard work and dedication of Dr. Jerry S. Davis, director of Sallie Mae's Education and Student Loan Research department, and author of the full research report found in the appendix. His statistical and analytical rigor, and demand for excellence, challenged all participants to do better in their contributions. We are thankful also to JBL Associates of Bethesda, Maryland, for designing and testing the computer diskette version of the survey, which helped make it easier for colleges to respond to a long series of questions.

Three individuals well-known to APPA and NACUBO helped in the final stages of the project by reviewing the drafts of this text. Their comments and suggestions greatly improved the final document. We extend our appreciation to Brenda N. Albright, higher education consultant based in Franklin, Tennessee; William A. Daigneau, University of Texas M.D. Anderson Cancer Center; and Craig A. Roloff, Montana State University.

We also wish to thank Dr. Harvey H. Kaiser for working under tight deadlines to place the research report into context and provide conclusions and policy implications to leaders of influence at federal, state, and institutional levels. His superb writing in *A Foundation to Uphold* reflects his, and our, deep respect for higher education and concern for its future.

Finally, we are grateful to the many individuals who took the time to share with our researchers their best information on the condition of the facilities at their institutions. We thank them for their support, and we hope this publication gives them and other readers the information they can use to improve the learning environment of their colleges and universities.

Executive Summary

A Foundation to Uphold

The growth and expansion of higher education in the United States is one of the most durable and impressive success stories in the history of American domestic institutions. In the mid 1990s colleges and universities claim more students and employ more faculty than ever before. More institutions enjoy well-deserved reputations for educational excellence and community service. The remarkable expansion and growth of higher education is evidence of the wide range of benefits that have popularly been considered to flow from higher education.

The public sector of governments and the private sector of corporations, foundations, and individuals have provided a foundation for higher education for the benefit of all members of the American society. These sectors have an obligation to continue to uphold colleges and universities at adequate financial levels to assure that all individuals have access to higher education in safe and healthy, functional, and attractive environments. Concerned about campus physical environments, a collaboration of APPA: The Association of Higher Education Facilities Officers (APPA), the National Association of College and University Business Officers (NACUBO), and Sallie Mae led to a 1995 survey of higher education facilities conditions in the United States.

The survey results provide the context for policy guidance for federal, state, and local governments, statewide agencies of higher education, higher education associations, and institutional leaders. The estimated ***$26 billion*** in total costs to eliminate accumulated deferred maintenance, of which ***$5.7 billion*** are urgent needs, represent a threat to the capability of higher education facilities to support the missions of their colleges and universities. While many campuses made progress in reducing de-

ferred maintenance, there is an overall increase nationally since the survey's baseline year of 1988, the results of which were published in 1989 in *The Decaying American Campus: A Ticking Time Bomb.* Backlogs of deferred maintenance will continue to grow unless adequate resources are available for capital reinvestment and steps are taken to ensure safe, functional, and well maintained facilities.

Accumulated Deferred Maintenance

There is a wide range in the costs to eliminate deferred maintenance between public and private sector and college type. Institutions have either very little or very much accumulated deferred maintenance. Public colleges typically have more deferred maintenance than their private counterparts. The percentage of institutions with deferred maintenance reported in the $30 million to $60 million range should cause concern for colleges in all college types and, especially, for those that reported costs to eliminate deferred maintenance exceeding $100 million. Although backlogs of deferred maintenance of $100 million or more would be expected at universities, it is surprising to see that between 3 percent and 7 percent of the HBCUs (historically black colleges and universities), medical colleges, and two-year colleges also exceed $100 million in needs.

The $26 billion may be a conservative estimate. Contributing reasons for this position are the general practices of estimating deferred maintenance needs and the exclusion of infrastructure. Typically, infrastructure deferred maintenance adds 20 to 25 percent to backlogs estimated only for *buildings.* By assuming that infrastructure was not included in the campus provided data, the total cost to eliminate accumulated deferred maintenance can increase to $32.5 billion, and urgent needs to $7.125 billion.

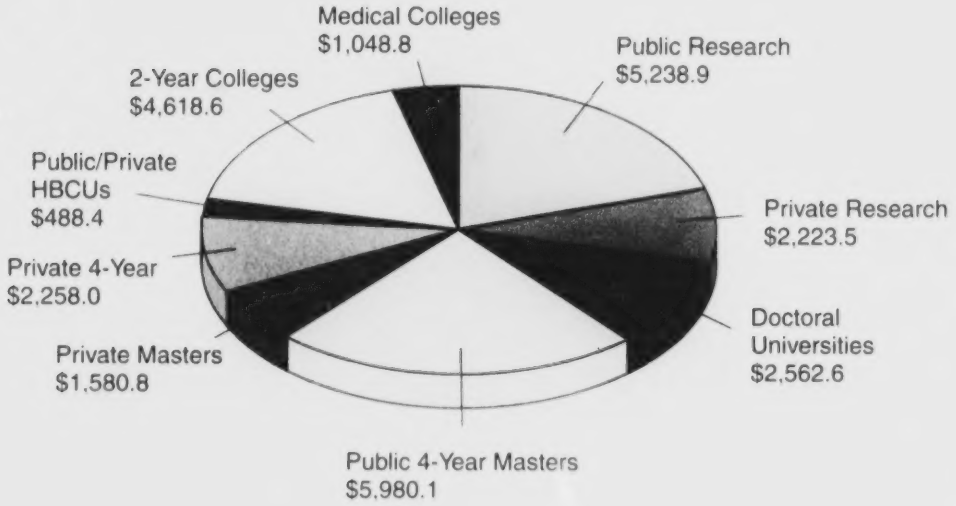
Factors Beneficial to Addressing Deferred Maintenance

The survey identified five possible factors that can cause change and influence treatment of accumulated deferred maintenance. Factors judged beneficial were ranked as follows:

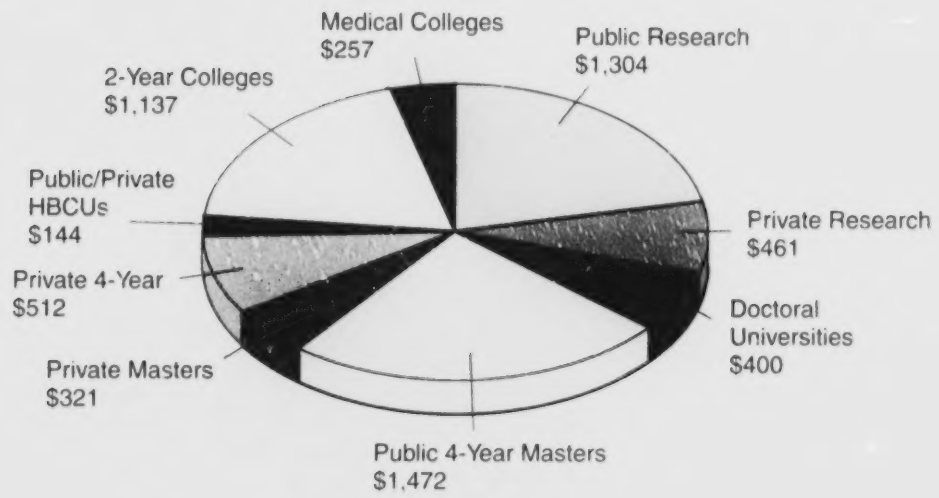
- Priorities of top administrators (80 percent)
- Support of trustees or legislators (73 percent)
- Budgetary and/or financial strategies (59 percent)
- Financial condition of the institution (46 percent)
- State appropriations (24 percent).

Estimated Cost to Eliminate Accumulated and Urgent Deferred Maintenance (ADM), by College Types *(dollar amounts in millions)*

Accumulated Deferred Maintenance



Urgent Deferred Maintenance



The most beneficial situation, deferred maintenance as a high priority for senior administrators, confirms the view that current unsatisfactory facilities conditions will continue to prevail unless campus leadership commits itself to addressing the problem.

Conclusions

The 1995 survey of higher education facilities conditions illustrates that where determined leadership placed deferred maintenance as a priority on their agenda, action followed. However, the survey also shows that there is a growing gap between those institutions with the will and the ability to find the means to reduce deferred maintenance backlogs and those that have taken little or no action. Much more must be done to encourage legislators, statewide system administrators, campus leadership, and supporters of higher education to develop the necessary public policies to address this issue and to allocate resources that will restore facilities to acceptable conditions.

The following policy implications are framed as guides to those persons involved in addressing accumulated deferred maintenance and who will shape the agenda for higher education's facilities and prepare the way for recommendations for action.

1. A Foundation to Uphold

The estimated $26 billion in total costs to eliminate deferred maintenance, of which $5.7 billion is urgent needs, represents a threat for higher education's facilities to support college and university missions. Backlogs of deferred maintenance will continue to grow unless adequate resources are made available for capital reinvestment. Competing demands on institutional resources have caused a fractious approach. Both the public sector of governments and the private sector of corporations, foundations, and individuals should strive to be leaders in the improvement of campus environments that includes establishing policies addressing the condition and adequacy of facilities, assisting campus leadership in meeting its role of stewardship, and providing necessary resources for reinvestment in capital plant.

2. Sustained Institutional Commitment to Action

Statewide agencies and individual institutions must make difficult choices for allocation of resources to support core missions and to reinvest in facilities. A checklist of institutional strategies should be part of an overall process, including setting of priorities, preparing strategic facilities plans, assessing the short-term and long-term implications of facilities

requirements, identifying deferred maintenance and capital renewal and replacement needs, setting goals for reducing accumulated deferred maintenance backlogs, improving maintenance management, and evaluating and improving effectiveness of space utilization. By setting priorities for reducing deferred maintenance backlogs, institutional leadership will express intention of actions and inspire public confidence.

Financial and facilities managers should act in a harmonious manner to achieve objectives for maintaining facilities within the context of overall institutional goals and priorities. Institutional financial and facilities managers should assist institutional decision-makers in considering the broad and long-term consequences of resource allocation that affect facilities. These managers have interrelated responsibilities to collect, analyze, and disseminate information; develop financial and facilities management plans; implement and control those plans; and evaluate plans.

The gap between institutional capacity to fund capital needs for deferred maintenance and annual capital renewal is increasing for many institutions. Colleges and universities with estimated costs to eliminate deferred maintenance that exceed 5 percent of their current replacement value, typically, must find external sources of funding for capital reinvestment. The decline in funding for operations and maintenance should be reversed to prevent future accumulation of deferred maintenance. Funding for deferred maintenance and capital renewal should provide a dependable source and flexibility in institutional management of expenditures and ensure that adequate resources are available to reduce deferred maintenance backlogs to manageable levels.

3. Roles and Responsibilities of the Higher Education Community

Numerous governments, institutions, organizations, and individuals play distinct and important roles in shaping policies and in the decision-making process for college and university facilities improvements. These roles are interdependent. The decision-making process must ensure that all of these roles are preserved and balanced if our pluralistic higher education system is to address unsatisfactory facilities condition in a cost-effective, equitable, and timely manner.

Essential to successfully addressing higher education's deferred maintenance and capital renewal problem is leadership by advocates who recognize the impact of unsatisfactory facilities conditions on the potential achievement of the institution's mission. The associations representing higher education constituencies should take an active leadership role in advocating resource allocation for deferred maintenance and capital renewal.

The identification and characterization of accumulated deferred maintenance and capital renewal are essential parts of shaping national policy and institutional decision-making for facilities-related issues. Future facilities data collection and analysis that build upon the 1995 survey protocol and methodology would create a comprehensive database of benefit to higher education policy-makers and institutional decision-makers.

4. Facilities Prepared for the 21st Century

The uncertainties of the impact of information technology on higher education capital asset management must be approached cautiously to ensure that the prioritization of facilities needs is made within the context of a strategic facilities plan. There must be dependable and integrated funding sources for capital reinvestment. There must be an understanding of the "learning" environment's affect on the "physical" environment. Critical also is the need to translate accurate data into useful information that in turn generates knowledge.

And, finally, it is necessary to be prepared to meet the demand for electronic delivery systems and information technology. Some specific issues that should be addressed include the overall effect of distance learning on space requirements; adaptability of existing space for new teaching methods; changes in the traditional patterns of daytime classroom and laboratory use; impact on campus attendance as faculty and students increase the use of electronic technology in the learning process; and the impact of non-traditional students on demand for on-campus residence and dining services.

Final Note

The 1995 APPA/NACUBO/Sallie Mae survey provides important data to aid the higher education community in addressing accumulated deferred maintenance. A substantial portion of colleges face large and increasing deferred maintenance problems on their campuses, although problems are not universal. There are serious predicaments at masters and baccalaureate, two-year, HBCUs, and medical colleges. The most serious challenges are located at the largest research and doctoral universities. Unless addressed, their ability to continue to lead the world in academic achievement is severely threatened.

Higher education associations can wield great influence to guide effective policy-making and focus institutional leaders on the need to eliminate or reduce their accumulated deferred maintenance. An ambivalent policy in regard to campus facilities conditions will hamper society's overall ability to gain what it seeks from higher education. Federal, state, and

local governments, and corporations, foundations, and individuals must make a sustained commitment to continue to uphold higher education facilities to assure the vitality and success in meeting the missions of public and private colleges and universities. In so many instances, past commitments to this obligation have enriched the lives of individuals, helped to secure America's place in a competitive global economy, and created flourishing national, regional, and local economies.

Chapter 1

A Foundation to Uphold

The growth and expansion of higher education in the United States is one of the most durable and impressive success stories in the history of American domestic institutions.[1] In the mid 1990s colleges and universities claim more students and employ more faculty than ever before. More campuses enjoy well-deserved reputations for educational excellence and community service. The remarkable expansion and growth of higher education is evidence of the wide range of benefits that have popularly been considered to flow from higher education. The public sector of governments and the private sector of corporations, foundations, and individuals have provided a foundation for higher education for the benefit of all members of the American society. These sectors have an obligation to continue to uphold colleges and universities at adequate financial levels to assure that all individuals have access to higher education in safe and healthy, functional, and attractive environments. Concerned about campus physical environments, a collaboration by APPA: The Association of Higher Education Facilities Officers (APPA), the National Association of College and University Business Officers (NACUBO), and Sallie Mae led to a 1995 survey of higher education facilities conditions in the United States.

The survey results provide the context for policy guidance for federal, state, and local governments, statewide agencies of higher education, higher education associations, and institutional leaders. The estimated ***$26 billion*** in total costs to eliminate deferred maintenance, of which ***$5.7 billion*** is urgent needs, represent a threat to the capability of higher education facilities to support college and university missions. While many campuses made progress in reducing deferred maintenance, there is an overall increase nationally since the survey's baseline year of 1988,

the results of which were published in 1989 in *The Decaying American Campus: A Ticking Time Bomb.* Backlogs of deferred maintenance will continue to grow unless adequate resources are available for capital reinvestment and steps are taken to ensure safe, functional, and well maintained facilities.

In addition to measuring the extent of deferred maintenance, the survey is informative about current facilities conditions nationally, for public and private sectors, and for college types as defined by Carnegie classifications. For many institutions, the gap between internal resources and the sometimes overwhelming deferred maintenance backlogs, as well as capital renewal projects, is widening.

The principal value of the survey and analyses of findings is that public policy-makers and campus decision-makers have an assessment of conditions that measures national and institutional needs. These findings are useful for comparisons to conditions for their statewide systems and individual campuses. Conclusions and policy implications drawn from the survey will, hopefully, be a springboard for action by the higher education community and its supporters.

In order to continue America's role as a world leader in higher education, it is essential that a sustained commitment be made by both the public and private sectors to continue their support at adequate levels. These sectors should strive to be leaders in the improvement of campus environments by establishing policies addressing the condition and adequacy of facilities, assisting campus leadership in meeting its role of stewardship, and providing necessary resources for reinvestment in capital plant.

An Academical Village

Almost two centuries ago, Thomas Jefferson described a concept for a place, "an Academical Village," that would be a physical setting conducive to the diffusion of knowledge through public education at the collegiate level. His idea was to create an institution that integrates learning with its physical environment. Jefferson's design, eventually resulting in today's University of Virginia at Charlottesville, influenced many campus plans around the world. It is justly recognized as one of the most outstanding architectural achievements in this country, and the university has provided outstanding stewardship in the care of Mr. Jefferson's inspiring legacy.

Indeed, it was Jefferson's genius of design and prescience about care of facilities that cautioned against the deferred maintenance problems of

many of today's campuses. With special acumen, he foresaw the potential for campuses becoming disagreeable places in a letter written in 1810 to the trustees of a proposed college in Tennessee. Jefferson explained a design that favored small-scale structures and open space in lieu of large, monumental structures and then stated: ". . . the whole of these arranged around an open square of grass and trees would make it, that should be in fact, an Academical Village, instead of a large and common den of noise, of filth, & of fetid air."

One wishes that Jefferson had added to his concept for the design of an Academical Village specific instructions about the future care necessary to avoid "noise, filth, and fetid air." After five decades of spectacular and unabated growth there are now problems in campus physical plants due to lack of adequate care and planning to renew facilities. Problems range from modest needs for the renewal of aging facilities to examples that verge on the worst of impediments to institutional missions. In the most severe cases, accumulated backlogs of deferred maintenance imperil core mission functions and threaten institutional financial stability.

Campuses Today

Today's colleges and universities in the United States represent 50 years of sustained growth that resulted from a host of factors. A unique aspect of this growth is the change in access to higher education with a transformation from an elite to a mass phenomenon. Federal financial aid and other student assistance programs allowed many students to pursue advanced degrees who otherwise would have found it difficult to finance a higher education.

What has often been called the "Golden Age" of U.S. higher education dawned in the late 1940s. A revolution in access to a college degree began with World War II veterans taking advantage of the Serviceman's Readjustment Act of 1944 (G.I. Bill of Rights). Higher education rapidly and imaginatively responded to the demand with an expansion in the number of institutions, innovative (or new) academic programs, and the construction of new facilities. Growth continued in another dimension in the late 1950s when the Soviet Union launched Sputnik and began the "space race." As a result of federal support, campus-based science and technology research forged ahead. Building on the foundation of growth, an upsurge in the national birth rate added a new generation of students to burgeoning campuses. The "baby boomers" arrived on campuses in the 1960s and 1970s to add further demands for added campuses and facilities.

A sampling of statistics for this dramatic growth period is revealing:

- Total higher education enrollments increased more than six-fold, from 2.3 million in 1950 to 14.2 million today
- Instructional staff increased from 176,000 in 1950 to 823,000 in 1994, a growth of more than 460 percent
- The total number of institutions grew by more than 100 percent, from 1,852 in 1950 to 3,768 in 1995
- Campus space increased from 570 million gross square feet (GSF) in 1950 to approximately 4 billion GSF in 1994
- More than 80 percent of today's total campus space was built by 1980
- Higher education would have to invest more than $500 billion to replace its buildings, fixed equipment, and infrastructure.

Groundbreakings for new campuses and buildings, mud on campus walks, and ribbon-cuttings were common experiences during the phenomenal growth of higher education. But by the late 1970s and early 1980s, observers were making gloomy predictions about the older campus facilities. Several factors were converging that would affect college physical plants. Inflation, soaring energy costs, the questionable quality of the new construction, and the need for facility reinvestment were beginning to add to mounting financial burdens during a national recession. Neglected campus buildings, grounds, utilities, and infrastructure were added to the competition for funding of new academic programs, research, personnel salaries, and facility reinvestment.

The National Center for Educational Statistics (NCES) reported in *Inventory of Physical Facilities in Institutions of Higher Education, Fall 1974* that approximately 20 percent of campus facilities were in an unsatisfactory condition. Alarming in its implications, the data began to bring attention to the issue of deferred maintenance. Observers of facilities neglect, mining the *Inventory* for the detailed effects on different sectors and college types, alerted the higher education community to future problems. Publication titles described the conditions: *Mortgaging the Future*, *Crumbling Academe*, and "Before the Roof Caves In." Fourteen years after the *Inventory*, *The Decaying American Campus: A Ticking Time Bomb* reported $20.5 billion in accumulated deferred maintenance. Some institutions heard the messages and addressed the problem. Surveys of individual campus conditions, sometimes producing estimates in the tens and even hundreds of millions of dollars, inspired

action. Unfortunately, too many other campuses have missed the message and are increasing their burden of future debt to correct today's capital renewal and yesterday's deferred maintenance.

Audiences

There are several audiences concerned about the condition of higher education's facilities. Present and future campus stakeholders—students, faculty, and staff—must function in safe and usable classrooms, laboratories and offices and in attractive and well-maintained environments. Those members of the public who support higher education—parents, friends, foundations, and corporations—justifiably are concerned about the condition of their capital investments. The governing boards and coordinating agencies charged with stewardship responsibilities must ensure that facilities are available and in a condition that is conducive to learning and the diffusion of knowledge. Because of the ***obligation*** of state and federal governments to higher education in support of the nation's goals, there should be a deep interest among legislators in reports on the conditions of deteriorated facilities and appeals for assistance.

Knowledge of the cost of remedying deferred maintenance is essential to framing public and institutional policy. Rather than speculating on conditions and costs, the 1995 APPA/NACUBO/Sallie Mae survey makes available data of a reliable nature. With a better understanding of current facilities conditions, legislators, governing boards, and campus administrators will be better informed for making resource allocation decisions.

To be useful, a report of facilities conditions at the national level must also be relevant to different *sectors* (public and private systems and institutions) and college types (as defined by the Carnegie classification system)[2]. The convention of "sector" and "college type" is used throughout the remainder of this report. See pages 70–71 for a description of the Carnegie classifications. Data, analysis, and recommendations on the national scale that assist in policy-making for all of higher education may have little relevance to governing boards and campus administrators who are interested in how their institutions compare to similar institutions. The survey was designed with a sample large enough to provide findings and conclusions for a broad cross-section of campuses and enhance its usefulness for analysis of various subgroups. Thus, diverse institutions will find analyses and benchmarks useful for their purposes.

The 1995 Survey

The challenges of obtaining information about the amount of campus accumulated deferred maintenance on a national scale drew the attention of APPA, NACUBO, and Sallie Mae. Joining forces in late 1994, they determined that *The Decaying American Campus*, published in 1989, should be updated. As a result of that commitment, a survey conducted in 1995 and analyzed by staff of Sallie Mae provides the context for this book.

A major goal of the survey process was to ensure that the methodology could provide credible conclusions and statements of policy implications. The survey concept, design, and implementation process focused on obtaining data from a sample of institutions large enough to allow meaningful statistical inferences and data analysis. A carefully constructed sample of 2,063 institutions, selected to represent most colleges and universities, was identified to be surveyed. Eventually, the overall response rate was 19.4 percent, or 400 out of 2,063 surveyed institutions.

The survey included several campus populations identified by sector and according to their college type. Included in the college types are:

- Research Universities
- Doctoral Universities
- Masters and Baccalaureate Colleges and Universities
- Baccalaureate Colleges and Universities (Four-Year)
- Associate of Arts (Two-Year) Colleges
- Medical Schools and Medical Centers (Medical Colleges)

Historically black colleges and universities (HBCUs) were included as a special category. Mostly baccalaureate and masters colleges and universities, these institutions are not identified separately as a category in the Carnegie classification system. In survey findings described throughout this report, the HBCUs are included only once in that category and are not double-counted in other college types.

In any research involving samples, there is always concern as to whether the sample or, in this case, survey respondents, is representative of the population. The research team referred to many other sources for corroboration of survey responses. Some data elements represent calculations of averages for *respondents*, while others are for *populations*. The dichotomous nature of some of the data, that is, where some institutions have *little* and others have *lots* of a category, is presented with ranges of response. For example, costs of urgent need are distributed in this manner. The reader of this report should bear these comments in mind when comparing findings and conclusions to their institutions.

Survey Report Limitations

The author is aware of concerns about the usefulness of the data and findings as campuses search to compare themselves with peer institutions. In this survey, larger, more complex institutions were more likely to have responded. Smaller institutions are less likely to have sufficient staff and the readily available data to answer the kinds of questions posed by the survey.

While the survey yields key indicators for comparative studies between institutions to guide policy decisions on resource allocation, precise data about a desired cohort is difficult to obtain for several reasons. For example, a limited number of campuses and public systems have completed facilities audits. The usefulness of deferred maintenance estimates derived without the benefit of a facilities audit is suspect. Another problematic area is due to the coincidence of several surveys simultaneously requesting information on deferred maintenance. Because of the high interest in measuring the condition of campus facilities, independent surveys compete to obtain the same information. Frustrations about duplicative requests for reporting diminishes the attention given to providing complete and accurate data and decreases response rate.

Despite some limitations, the survey's data is complete enough to provide benchmarks of various measures that are useful for development of facilities strategies and resource planning. *What is most essential for an institution is to understand its own needs and capacity for remedial action and to begin a program to implement the reduction of deferred maintenance backlogs.*

Terminology

The survey required respondents to provide a variety of statistical, financial, and operational data about their specific institutions. Definitions included with the survey enabled respondents to better understand the questions and, in general, provide useful responses, even though there is considerable inconsistency among campuses with regard to nomenclature. However, circumstances influenced by existing federal and state survey definitions, standard accounting practices, and institutional traditions and reporting methods required the tailoring of available information to fit the survey questions.

Deferred maintenance is an identifiable backlog of major maintenance projects unfunded in operating budgets and deferred to a future budget cycle. Accumulated deferred maintenance results primarily from two causes. Underfunding of *routine maintenance* is one cause of the

neglect that allows minor repair work to evolve into more serious conditions. The problem is further compounded by the choices made during stringent financial times when budget cuts frequently are made to maintenance. Another cause is the ***failure to take care of major projects to repair and/or restore facilities*** that have reached the end of the their life cycle. Roofs, mechanical systems, and exterior wall materials deteriorate over time in predictable life cycles and require regular renewal and replacement.

Some statewide systems and private colleges and universities use ***major maintenance*** and ***capital renewal and replacement*** interchangeably. Others adopt the term ***repairs and renovations*** or ***repairs and replacements*** to cover the same kind of projects. There is no substantive difference between the terms. The difference may be simply in the choice of terms or may be due to accounting practices that distinguish between annual operating budgets and projects that are treated as ***capitalized*** on a college's accounting statements. For purpose of consistency, ***capital renewal and replacement*** is used here as a broad term to include all aspects of ***major projects*** that are reinvestments in facilities.

Capital renewal and replacement, then, is defined as all the actions to remedy existing deferred maintenance and to prevent future deferred maintenance by adequately funding reinvestment in facilities. To clarify terms one step further, ***renewal*** and ***replacement*** are often used as synonyms. ***Renewal*** is the repair and replacement of parts of a system or components, such as fixing a steam line, repointing brickwork, or replacing steam traps. ***Replacement*** is the substitution of a new system or components for a major portion of a facility. A new facility that replaces an existing one should not be considered a replacement but as ***new*** construction. All these terms describe projects for both buildings and infrastructure.

Renovation is the altering of a space, to modernize and eliminate obsolescence, or an entire facility, for a new program requirement. Major renovation projects larger than those funded from operating budgets can incorporate capital renewal and/or deferred maintenance. Planning projects to include capital renewal in renovation projects is used as a strategy to maximize cost-effectiveness of funding. ***Adaption*** is a relatively new term used for code compliance required to maintain facilities in conformance with new standards for life safety, systems and components, environmental regulations, and disabled access. These are measures that may not renew facilities or reduce deferred maintenance backlogs. However, they usually are capital costs and should be included in overall capital budgeting and planning.

Estimates of ***capital renewal and replacements*** in the range of 1.5 to 3.0 percent of current replacement value are based on empirical studies of higher education.[3] The specific amount for a campus can be calculated to predict the annual funding necessary to offset cyclical requirements. This amount, along with the operations and maintenance budget, is an element of the overall annual operating budget needed to maintain all of a college's facilities. Projects for major renovations and adaption, sometimes capitalized on accounting statements, require separate forecasts of priorities to complete the total facilities budget. The reduction of deferred maintenance backlogs requires still another stream of funding, separate from the total annual facilities maintenance operating budget.

Notes

1. David W. Breneman and Chester E. Finn Jr. *Public Policy and Private Higher Education*. Washington, D.C.: The Brookings Institution, 1978. p. 413.
2. Kaiser, Harvey H. *The Facilities Audit*. Alexandria, Virginia: APPA: The Association of Higher Education Facilities Officers, 1993. p. 46.
3. Ibid.

Chapter 2

The Condition of Higher Education Facilities

An overview of the context of higher education's facilities and their conditions is essential background for understanding the observations and conclusions drawn from the survey. The following are summaries of data from the survey; national totals of various institutional characteristics that inform policy-makers about the sources and broad dimensions of deferred maintenance backlogs and future capital renewal requirements; benchmarks of key indicators that are especially useful for comparative purposes; and campus actions to reduce deferred maintenance backlogs.

Survey Data and Findings

Far beyond Thomas Jefferson's vision of an Academical Village—"a collegiate place for the diffusion of knowledge"—colleges and universities now fulfill multiple roles. At once, colleges and universities serve as educators, employers, sources of innovations and inventions, consumers of goods and services, contributors to the national and local economies, and in other roles.

The magnitude of today's academic enterprise is illustrated by several measures of its size in 1995, such as:

- 3,768 colleges, universities, and specialized institutions
- 14.2 million students
- 2.1 million employees

- 823,000 faculty and other instructional staff
- 4 billion square feet of space
- Current fund expenditures of $177 billion
- Facilities replacement value of more than $500 billion
- Peak period of campus construction was from 1961 to 1972 when one-fourth of the existing space was constructed
- About 80 percent of space was in place by 1980 and the median age of buildings is 28 years.

The following are facilities-related characteristics and key indicators of facilities conditions at the national level, by sector, and by college type. The indicators serve as the source of benchmarks for comparative purposes and statements of policy implications.

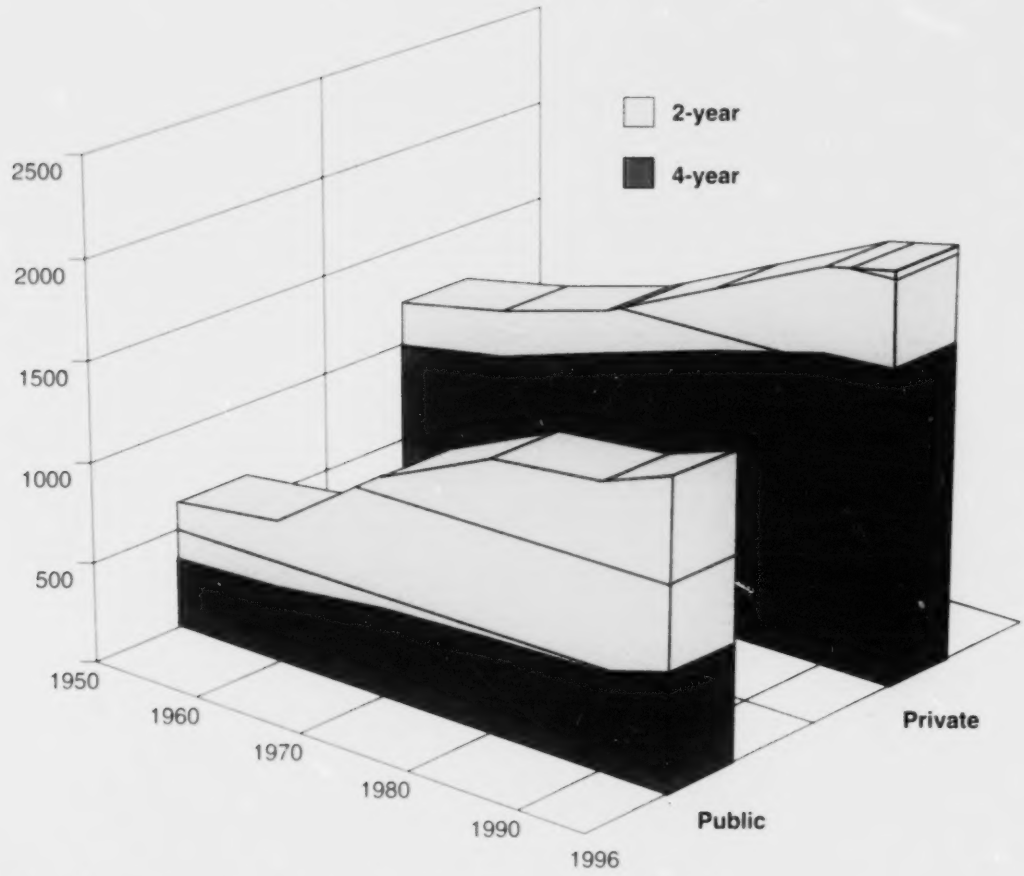
Number of Institutions

Choices for meeting the increased demand for a college education are to expand existing institutions or to build new ones. During the past 50 years higher education did both. There was a period in the 1970s when new institutions were opening their doors at the rate of one every two weeks. The largest share of this growth was among two-year colleges. The number of institutions almost doubled to reach the 1996 total of 3,768 (Figure 1) even though 364 campuses closed down their operations during the same period. The building of new campuses has slowed in recent years and most of the additions are now accounted for by the designation of branch campuses as free-standing institutions.

A half century of growth in higher education produced a changing distribution of public and private institutions. These shifts within the mix of sectors and college types during the period of higher education expansion affect public policy. At the same time the number of private institutions increased, the *rate* of increase was greater for the public sector. While private colleges and universities accounted for 66 percent of the institutions in 1950, by 1995 this figure had fallen to 55 percent, primarily because of the remarkable expansion of the public two-year colleges. Now, 40 percent of campuses are at the two-year level or serve special populations. A shift to an increased number of public institutions, especially the public two-year colleges, partially explains the increased interest by the taxpaying public in the cost and value of a college education.

Conversion of institutions that previously granted only bachelors or masters degrees to universities awarding doctorates is another compo-

Figure 1 Growth in Number of Institutions, by Control and College Type: 1950–1994



NOTES: 1. Control totals exclude specialized institutions from post-1980.
2. Branch campuses were included with main campuses prior to 1974–75.

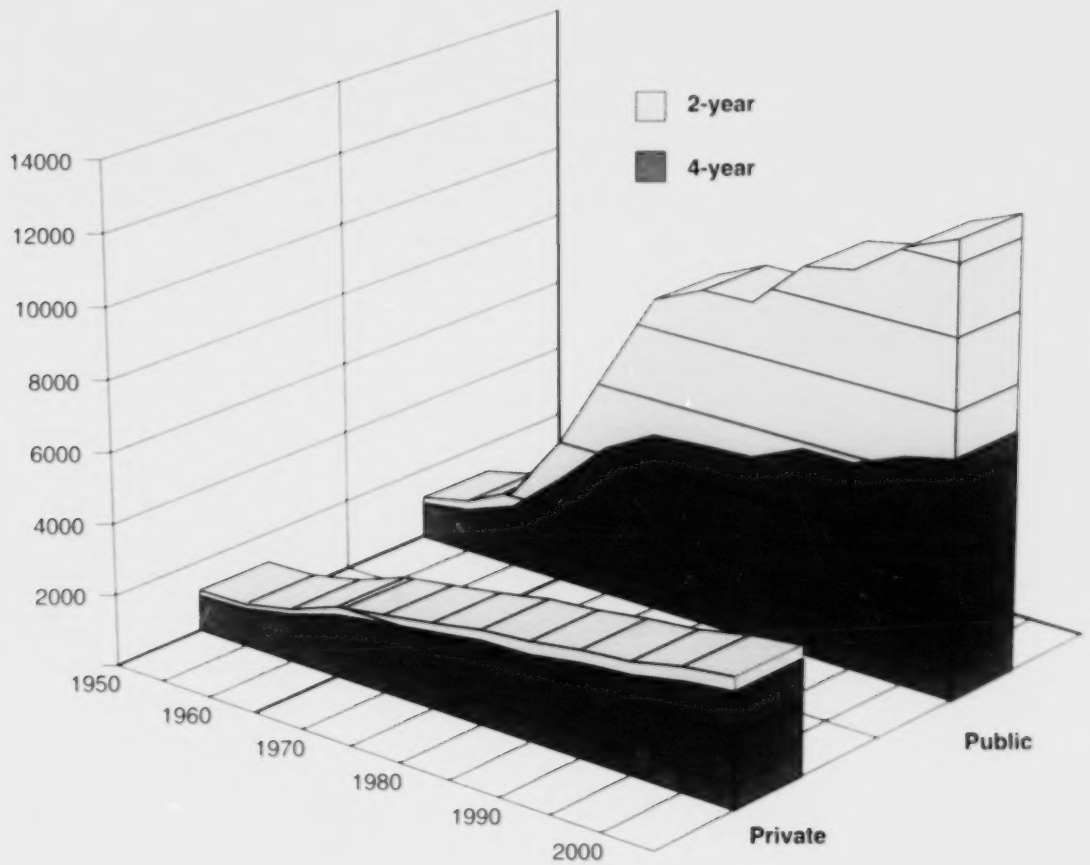
Source: *1996 Higher Education Directory*. Falls Church, Virginia: Higher Education Publications, Inc., 1995 (p. xlv)

nent of the change in mix of institutions. Some of these "new" universities now are major research institutions that rival older, more established ones in scale and complexity. Adding to older campuses rather than building new ones, or adding new buildings without repairing old ones, contributed to increased deferred maintenance. Former undergraduate institutions rapidly added classrooms, laboratories, offices, and support facilities for student life (housing, dining, recreation, and athletic facilities), while ignoring capital renewal for older facilities. Additions to buildings and layers of new infrastructure added over existing systems expanded capacities without completely modernizing older systems.

Enrollments

Student enrollment is the principal engine that drives the demand for campus space. From 2.3 million students in 1950, enrollments have increased to today's total of 14.2 million, and are projected to reach 16.2 million by the year 2005. As Figure 2 indicates, the mix of enrollment has changed between sectors and college types during periods of enrollment growth. With almost three-fourths of the students attending public colleges, there is a persuasive case for government involvement in strategies to reduce deferred maintenance backlogs. Public policy

Figure 2 Enrollments by Control and College Type: 1950–2005
(in thousands)



Source: *Digest of Higher Education Statistics.* Washington: U.S. Department Of Education, Office Of Educational Research and Improvement, 1995 (Table 208).

makers who are formulating strategies to deal with deferred maintenance should not overlook the fact that one-fourth of all students attend private colleges, some with important facilities needs.

A profile of enrollment distribution by college type shows that *where* students attend college affects ***how many*** students are impacted by unsatisfactory facilities conditions. Despite the sizable numbers of small colleges, most students attend the larger ones (Figure 3). In 1993, 37 percent of college campuses had fewer than 1,000 students; however, these campuses enrolled only 4 percent of college students. While 12 percent of the campuses enrolled over 10,000 students each, they accounted for 51 percent of total college enrollment.

Employees

Campus employees are included in the total campus population affected by capital renewal needs and accumulated deferred maintenance. There should be concern about the working environment for the 2.6 million college and university faculty and non-teaching staff (Figure 4). Unsatisfactory facilities conditions impairs their ability to conduct productive activities in safe, functional, and attractive facilities.

Who uses space and *when* it is occupied can affect planning for capital renewal projects. The largest share of employee space is for offices. Depending on college type and enrollments, the range is from approximately 7 to 17 percent of total space. Faculty FTE size has increased from 1950 to 1995 by 670 percent to today's total of 823,000 (Figure 5). Full-time faculty and other teaching staff are approximately 40 percent of total employees, ranging from 35 percent at four-year colleges and universities to 55 percent at two-year colleges.

When space is occupied—at various times of the day and different weeks of the year—can also affect the selection of capital renewal priorities. Colleges differ widely in their employment of full-time and part-time staff, with public institutions having more FTE employees than private campuses. Working in unsatisfactory facilities creates a reservoir of employee dissatisfaction. While in general this is harmful to morale, it can be tapped as a resource for advocacy to improve conditions. Although all staff will have concerns about their working environments, those institutions with large proportions of full-time staff probably will have a greater incentive to fund capital renewal and deferred maintenance backlogs.

Figure 3 Distribution of Students, By Size and Control, 1993

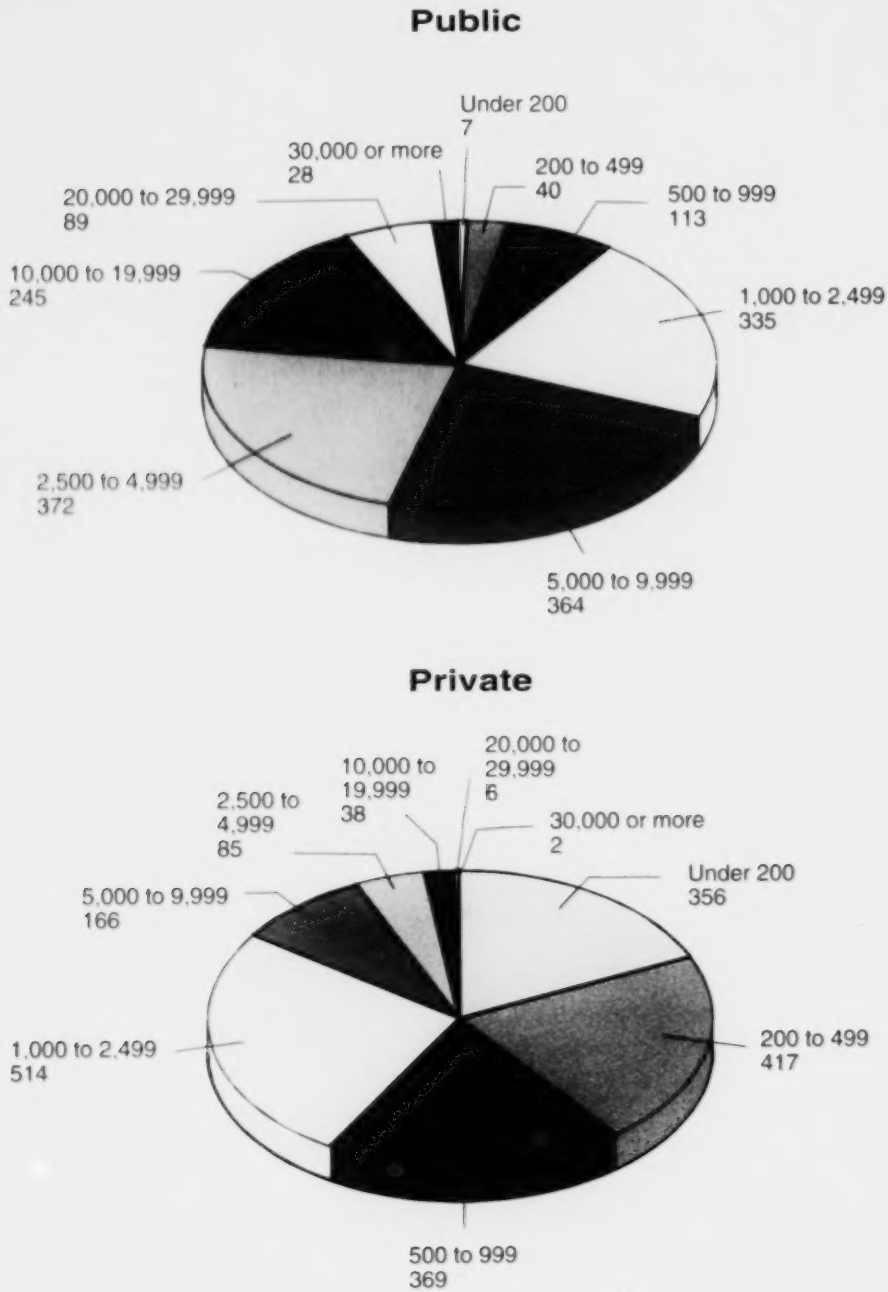
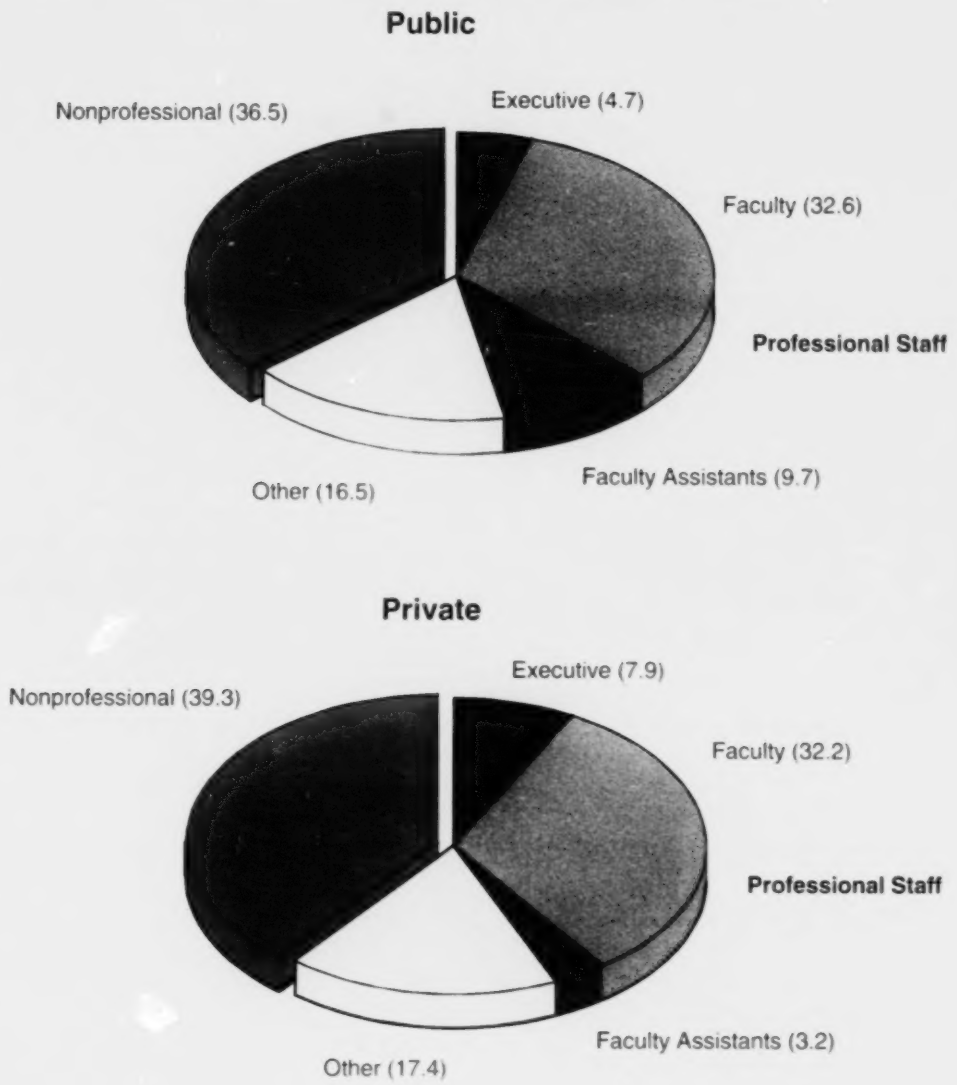


Figure 4 Total Faculty and Staff by Occupation, 1993

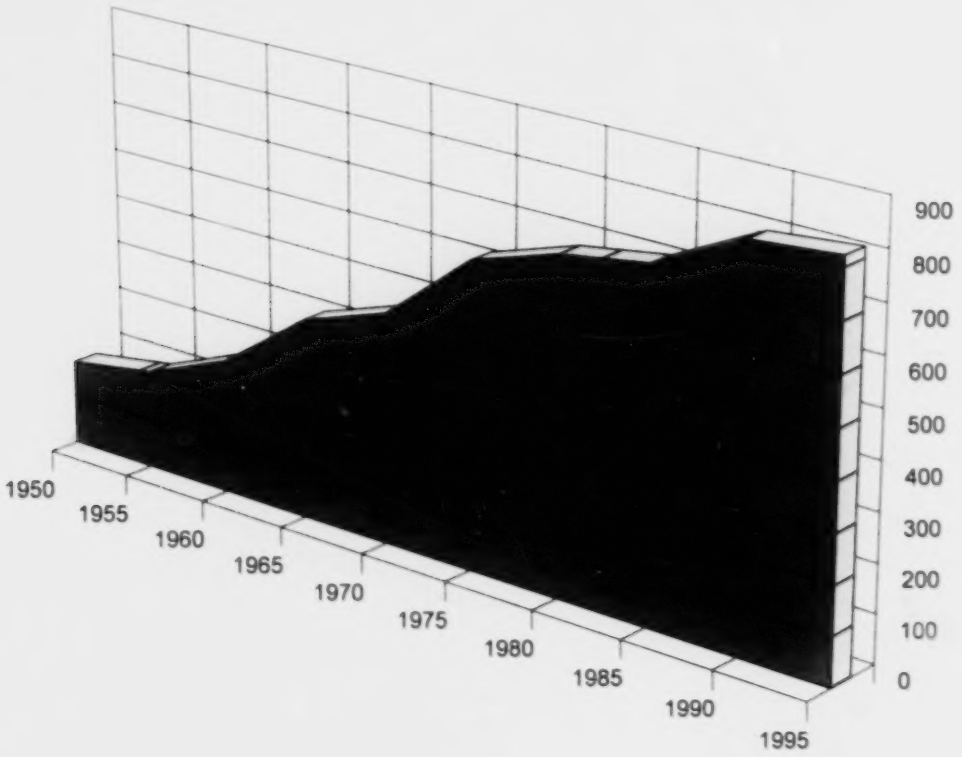


Source: *Digest of Higher Education Statistics.* Washington: U.S. Department Of Education, Office Of Educational Research And Improvement, 1995 (Table 214).

Space

The enormous demand placed on higher education by increasing enrollments produced a substantial growth in the amount of physical plant space. Total campus space increased 500 percent from 811,000 GSF in 1950 to today's estimated 4.001 billion gross square feet of space (Figure 6).

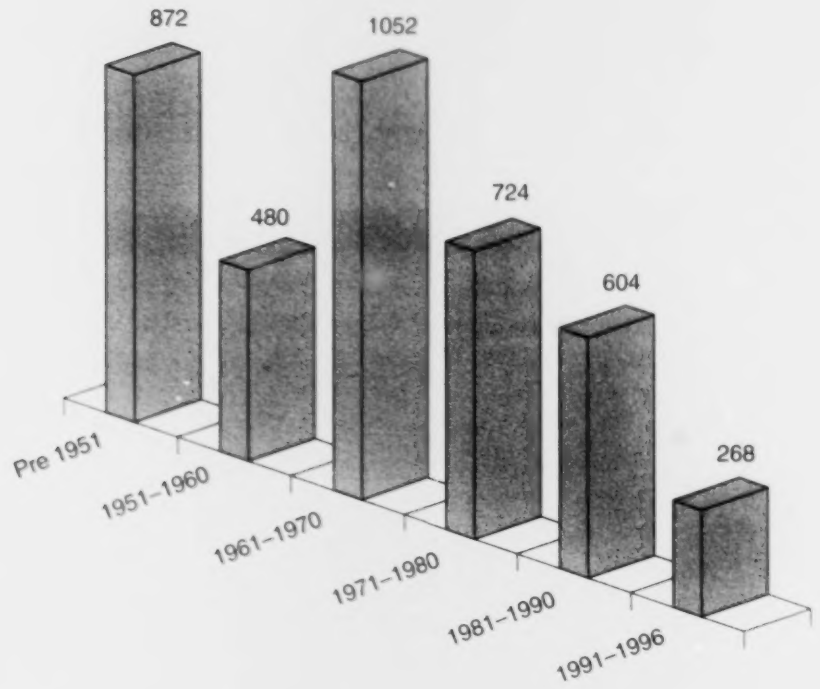
Figure 5 Total Faculty and Senior Instructional Staff, 1950–1995 *(in thousands)*



Source: *Digest of Higher Education Statistics.* Washington: U.S. Department Of Education, Office Of Educational Research And Improvement, 1995 (Table 217, and estimates).

A caution in the use of data only on *space* as the measure of capital renewal and deferred maintenance is that, although infrastructure information was requested in the survey, it is questionable whether it was included by all respondents. Thus, it is probable that infrastructure is underestimated and the estimated accumulated deferred maintenance is conservative. Typically, building-related capital renewal and deferred maintenance represents only 75 percent of total financial needs. Unfortunately, many institutions address only ***buildings*** in counting their accumulated deferred maintenance. The remaining 25 percent is the infrastructure portion of total plant current replacement value. Capital renewal and deferred maintenance budget requests risk a loss of credibility if the total is later increased for ignored infrastructure.

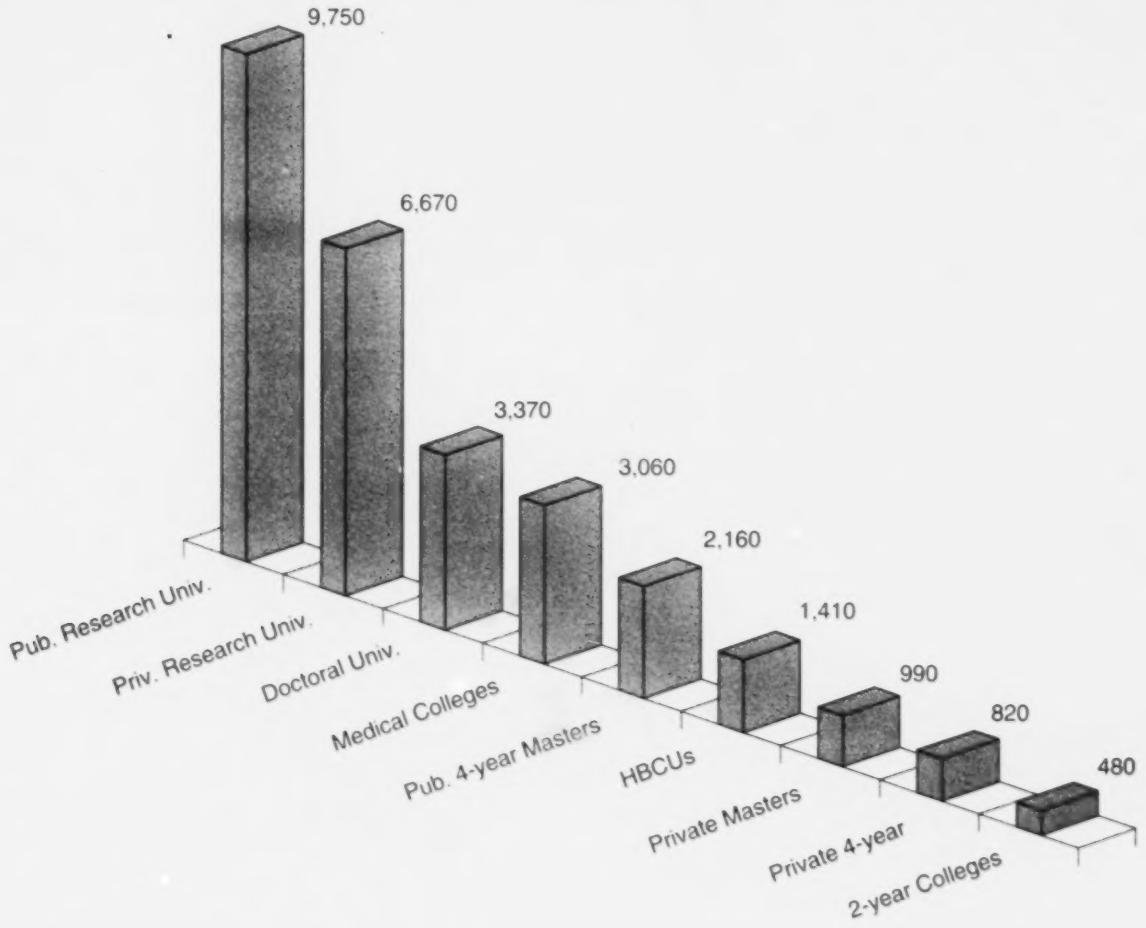
Figure 6 Construction of Total Campus Space: 1950–1994
(millions of square feet)



Benchmarks that use GSF in combination with other characteristics of a campus enable comparisons between institutions. Data on total amount of space by college types provides a basis for comparisons between similar type campuses. Figure 7 shows the average square footage for each college type in 1994.

Data on the distribution by facilities types is useful to campus planners when prioritizing capital renewal and deferred maintenance projects. For example, a campus can determine that classrooms or other types of space are the highest priority need for capital improvements and then make decisions within the context of overall needs. The data is also useful for comparing design and utilization standards used in the design and/or evaluation of proposed projects for new facilities and major renovations. These benchmarks for different types of space are now subject to close scrutiny by coordinating agencies and individual campuses allocating resources between new construction and capital renewal. See Table II-5 for more information.

Figure 7 Average Campus Space by College Type: 1994
(amounts in thousands of square feet)



Age of Facilities

Date of construction, along with a history of repairs and replacement, can be used to predict capital renewal and deferred maintenance needs for buildings and infrastructure. The inevitable deterioration of college and university facilities goes on as surely as the arrival of another year's commencement. Life cycles inherent in building and infrastructure systems and components cause the need for periodic renewal and, where maintenance funding and performance have lagged behind needs, suggest the presence of deteriorating facilities. The median age of facilities at all colleges and universities is 28 years, indicating where campus facilities are in the aging process.

Approximately one-third of all campus space was built before 1960 and 60 percent was in place before 1970. Another billion square feet of space added in the next decade, to reach a cumulative total of 3.1 billion gross square feet (GSF) by 1980, almost 80 percent of today's total of 4 billion GSF. The median year of construction of buildings for all colleges and universities is 1967. Buildings from peak construction periods—the 1960s or 1970s, depending on the campus—are in the potential problem category. In addition to age, there is a recurring problem of early failure of materials and assemblies of systems and components. Roofs that failed before the end of their 20-year warranties have created a major industry for problem detection and replacements.

Facilities can continue to perform effectively as long as regular maintenance is adequately funded and performed and reinvestments made in capital plant. The aging of facilities can be overcome through renovation projects designed to include capital renewal and deferred maintenance. Renovations to campus facilities in the past 20 years suggest that possibly some attention was directed to capital renewal and reduction of deferred maintenance backlogs. Renovations can include capital renewal and deferred maintenance needs in the work to modernize or adapt existing facilities to new programs.

Building Size

As a consequence of teaching and housing more students, conducting more research, and providing a wide array of other services (including larger football and basketball crowds), the cost-effective response was to construct larger buildings. The post-1990 average building size was 50 percent greater than buildings built before 1950. Although the average size of buildings is 44,000 GSF, the range is quite broad with domestic-scaled structures at one end and massive classroom, laboratory and research, residence and dining hall complexes, and recreational facilities built on the scale of hundreds of thousands of GSF, at the other.

The significance of campus building *size* is related to the selection of capital renewal priorities and planning of projects. Planning and selection of campus-wide priorities for deferred maintenance usually results in projects encompassing complete buildings or infrastructure systems because economies can often result from addressing an entire building at one time. This type of planning is the most cost-effective and least disruptive to campus programs. However, this approach can result in the postponement of projects on larger and more complex buildings because of limitations in funding capacity. For example, funding for a 20,000 GSF building can be more easily considered because of lower total cost than a project involving a building two or three times larger.

A solution for large and complex buildings used by many colleges is to manage projects in phases.

A wave of stadium expansions and arenas in the 1980s with their vast acreages of roofs and miles of complex mechanical and electrical systems is an example of the prospects for future capital renewal. These projects will represent costs that, individually, can absorb one or several years' budget for repairs and replacements and most certainly will require support from external funding sources. States that have established separate pools of funds for "repairs and renovations" recognize that current fund operating budgets are inadequate for funding these mega-size projects. Thus, as capital renewal and deferred maintenance backlog needs are estimated, size, in addition to the age, condition, and the complexity of a building, will affect the organization and scheduling of capital renewal projects.

Construction and Renovation

The amount of spending on capital plant for new construction and renovation can act, in some cases, as a proxy for capital renewal and reduction of deferred maintenance backlogs. Costs of construction and renovation provide references for comparing replacement versus new construction and for capital renewal projects. Other comparisons that are possible from the data include priorities for construction and renovation and sources of capital funds.

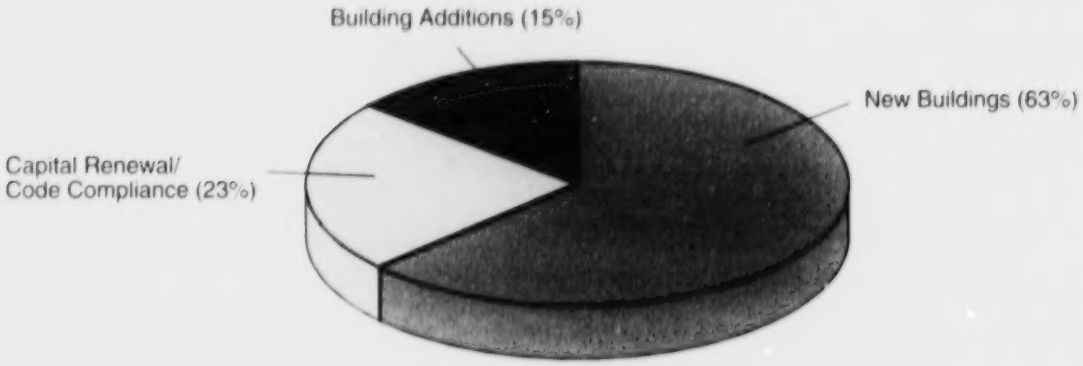
The following are highlights of data on construction and renovation that are related to analyzing capital renewal and deferred maintenance.

Building Pace Continues

Higher education completed an estimated $6.7 billion of construction in 1995.[4] This amount represents an increase from $6.4 billion in 1994. Colleges spent most of their construction dollars on new buildings (63 percent), less on additions (14 percent), and not enough on capital renewal and adaptions (23 percent) (Figure 8). Projects planned for the next three years (1996–1998) are estimated to total $17.6 billion.

It is uncertain just what proportion of new buildings and additions provided relief for capital renewal and deferred maintenance requirements by modernizing older facilities. However, the possibility of including capital renewal and adaptions in new construction and additions is a planning concept that should be pursued by colleges and universities. Preferably, future spending of capital funds will shift to emphasize capital renewal and deferred maintenance.

Figure 8 Allocation of Construction Expenditures, 1994



Costs and Priorities by Facilities Types

Institutions can compare their construction and renovation costs and priorities with other institutions of the same college type with the data in Figure 9. The range in costs for construction and renovation is significant and institutional experience, or other reliable industry sources, should be referred to in the preparation of capital project budgets.

The average building construction cost is $146 per square foot and $93 per square foot for renovation projects. However, it is important to understand the definition of reported amounts and ensure that usage of

Figure 9 Mean Construction and Renovation Expenditures per Gross Square Foot, by College Types

	Construction		Renovation	
	Cost/GSF	Priorities	Cost/GSF	Priorities
Public Research	$216	Labs, Classrooms	$148	Labs, Classrooms
Medical Colleges	198	Labs, Health Care	70	Health Care, Labs
Private Research	169	Labs, Classrooms	295	Labs, Offices
Private Masters	160	Special Use, General Use	32	Classrooms, Offices
Private 4-Year	133	Classrooms, Residential	29	Residential
2-Year Colleges	112	Classrooms, Offices	44	Classrooms
Public 4-Year/Masters	100	Classrooms, Support	55	Offices, Classrooms
Public/Private HBCUs	68	Classrooms, Special Use	10	Classrooms, Offices
Doctoral Universities	59	Special Use, Support	27	Classrooms, Residential
Average	$146		$ 93	

the term "construction" is consistent when comparing costs. Often, costs are reported only for "hard" construction costs that represent the value of construction contracts. The missing element of "soft" costs for design, fixed equipment, and other project-related costs can increase total project costs for budgeting purposes by 20 to 25 percent.

Sources of Funds

The doubt that current fund expenditures can be the sole source of funds to eliminate deferred maintenance is confirmed for many campuses when a thorough facilities audit and condition assessment is completed. Funding off-budget, in combination with operating funds, is the most common practice for institutions addressing capital renewal and deferred maintenance.

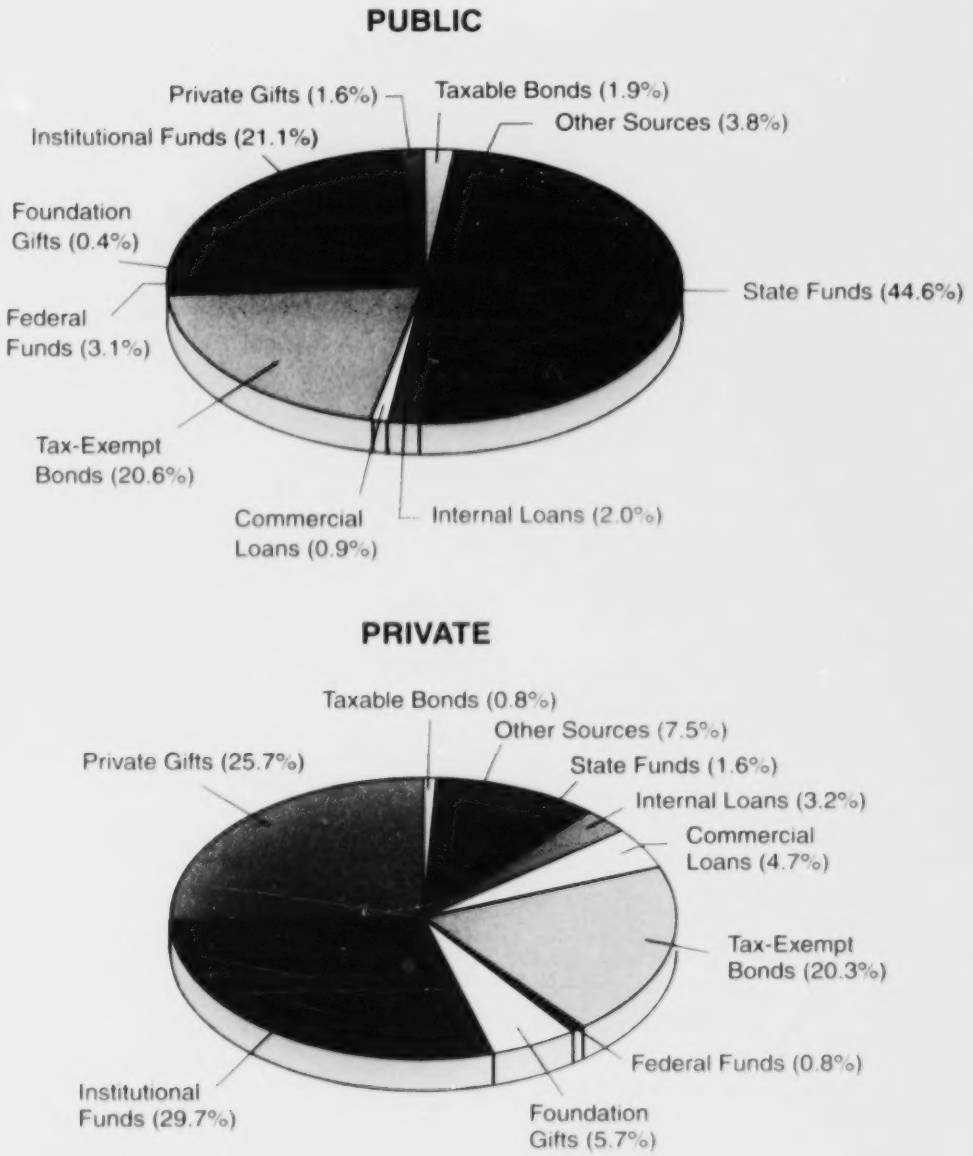
Sources of funds for construction and renovation reported by survey respondents illustrate where colleges acquire capital funds (Figure 10). Public or private control is the greatest determinant of funding sources. As expected, state funds accounted for 44.6 percent of the dollars at public four-year and masters colleges, but only 1.6 percent at private ones. Public colleges had somewhat greater access to federal funds. On the other hand, private and foundation gifts accounted for 31.4 percent of the private colleges' building funds, versus just 2 percent of the public colleges' funds. Both sectors resorted to tax-exempt bonds almost equally. Private colleges used more institutional funds than their public counterparts, representing an advantage in flexibility in use of discretionary financial resources.

Where colleges can obtain funding for capital renewal and accumulated deferred maintenance is suggested by sources of construction and renovation funding. The inadequacy of institutional funds to meet all capital demands requires the creative management of several additional sources of funds, sometimes for the same project. Funding of capital renewal and deferred maintenance needs is a challenge to college administrators, similar to obtaining construction and renovation project funding. There is a substantial challenge in store for administrators, statewide coordinating agencies, governing boards, and governments and other external funding sources.

Americans with Disabilities Act (ADA)

Actions taken by colleges and universities to respond to the Americans with Disabilities Act (ADA) can represent, in part, expenditures for capital

Figure 10 Sources of Funds for Construction and Renovation, by Sector: 1994



renewal and deferred maintenance. The survey performed a useful task by asking the following:

- What actions were taken by colleges with regard to the Act in the past two years?
- How much do colleges spend on campus alterations to comply with the ADA?
- How much do colleges think they will have to spend to achieve substantial compliance?
- How long will it take to achieve that goal (if they have not already achieved it)?

The survey's data and analysis of findings serves two important purposes:

- provides a summary of facilities aspects of higher education's response to the ADA
- suggests portions of capital renewal and accumulated deferred maintenance that may have been accomplished by actions intended to comply with the Act.

Because work to address accumulated deferred maintenance and capital renewal can be included in projects undertaken to meet ADA accessibility requirements, the survey asked the estimated proportion of the college's 1993–1994 ADA expenditures that were used to meet deferred maintenance needs. The survey found that the college average was only 17 percent, and only one-fourth said that 20 percent or more of their ADA expenditures could have been assigned to deferred maintenance or capital renewal.

Estimated future expenditures to achieve full compliance with the ADA averages nearly $4 million per institution. However, there was a wide range in the responses, with a few having substantial amounts and a much larger percentage having to spend relatively little. For example, over 31 percent need to spend less than an additional $500,000 to achieve compliance.

Actions taken by colleges included completing a survey to determine needs and appointing a coordinator or committee (over 80 percent) and creating formal plans to achieve compliance and rank-order needs (over 50 percent); 70 percent of the colleges had taken all three actions.

Highlights of the survey data are:

- Twelve percent of the colleges need to spend $10 million or more to comply with ADA
- Five percent of the colleges spent $500,000 or more in 1993–1994 on ADA compliance projects, but almost half spent under $50,000
- On the average, colleges spent the equivalent of only 7.2 percent of the total remaining amount they believe they will have to spend to achieve compliance
- It is estimated that expenditures of $9 billion will be needed in the future to achieve full compliance with the ADA
- Average cost per student to achieve ADA compliance is $850. About half the colleges should have to spend less than $375 per student to achieve compliance.

The reader is urged to review the complete research report in Appendix A on actions taken by colleges to respond to the ADA.

Notes

4. *American School & University*, May 1996, pp. 16–24.

Chapter 3

Accumulated Deferred Maintenance

The most pressing questions concerning deferred maintenance for higher education policy-makers and campus decision-makers are:

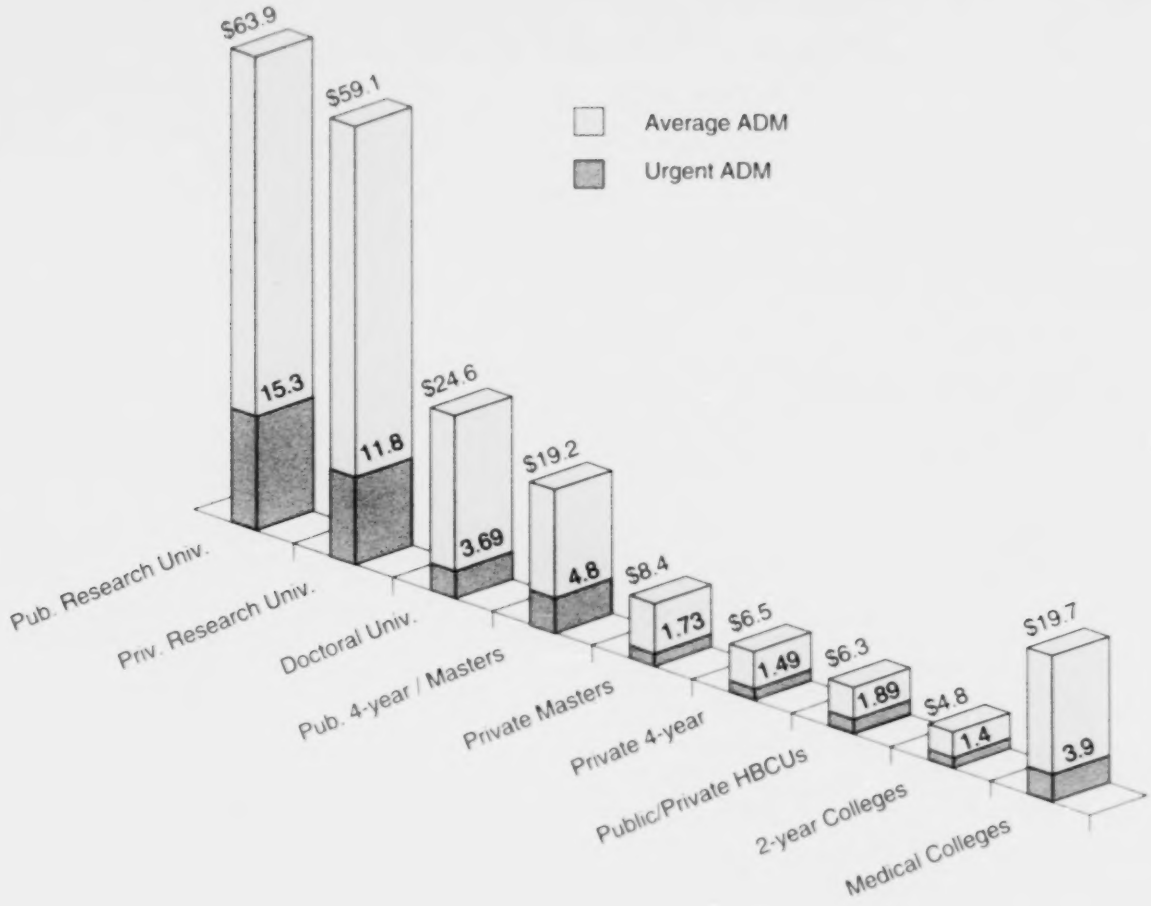
- What do we know today about the presence of, and current cost to remedy, deferred maintenance?
- How much of total overall campus needs is considered "urgent" and requires immediate attention?
- How does it affect different college and facilities types?
- What is being done to address deferred maintenance backlogs?

The most salient facts are that there is a large amount of deferred maintenance, greater than there was in 1988, and not enough is being done to improve conditions. Although the situation is dichotomous, that is, some colleges have very little and others have very much of it and some have addressed it while others have not, a substantial proportion of colleges face large and increasing amounts of deferred maintenance on their campuses.

Costs of Eliminating Deferred Maintenance

Total costs to eliminate deferred maintenance backlogs in 1994 are estimated at *$26 billion* for all colleges and universities (Figure 11). A percentage of the total is considered "urgent," defined as conditions which, if not attended to in the next year, will further deteriorate and become

Figure 11 **Average Accumulated and Urgent Deferred Maintenance (ADM), by College Types: 1994** *(dollar amount in millions)*



more costly to remedy in the future. Total costs to eliminate urgent deferred maintenance is estimated at *$5.7 billion* for all colleges and universities.

It is the author's opinion that $26 billion may be a conservative estimate, in part due to the general practice of estimating deferred maintenance needs and the frequent exclusion of infrastructure needs. Even though the survey requested information on infrastructure as part of total campus deferred maintenance, it is probable that, in many cases, it was not included. Typically, infrastructure deferred maintenance adds 20 to 25 percent to backlogs estimated only for *buildings*. If infrastructure was not included in the campus provided data, the total cost to eliminate accumulated deferred maintenance might approach $32.5 billion, with urgent needs of $7.125 billion.

Although universities represent just 8 percent of all institutions, they have more than one-third of the total deferred maintenance. Public masters and baccalaureate colleges represent 13 percent of all colleges, but have about 23 percent of the total. Therefore, one-fifth of the colleges have three-fifths of the accumulated deferred maintenance.

Institutions seeking comparisons of deferred maintenance with other campuses should first turn to their sector and then to their college type. Primary measures for comparability are: enrollment, gross square footage of campus space, age and condition of facilities. Other relevant factors are regional location, local environment (urban, suburban, or rural), and maintenance practices. Financial benchmarks related to costs to eliminate deferred maintenance as percentages of current operating expenditures and current plant replacement value are important comparative measures with other institutions, as well as measures of year-to-year changes in deferred maintenance.

Deferred Maintenance by Sector and College Type

There is a wide range in the costs to eliminate deferred maintenance by sector and college type at the end of 1995 (Figure 12). Institutions have either small or large amounts of deferred maintenance.

By sector, public colleges typically have more deferred maintenance than their private counterparts. The percentage of institutions with deferred maintenance reported in the $30 million to $60 million range should cause concern for colleges in all college types and, especially, for those college types that reported costs to eliminate deferred maintenance exceeding $100 million. Although deferred maintenance backlogs of $100

Figure 12 Total Funding Necessary to Eliminate Deferred Maintenance at the End of 1994–95, by College Type

	Accumulated Deferred Maintenance ($ in millions)					
College Type	**<$2.9**	**$3–$14.9**	**$15–29.9**	**$30–59.9**	**$60–99.9**	**>$100**
Public Research	4.5%	6.0%	6.7%	26.6%	31.1%	24.4%
Private Research	11.1	5.6	22.2	11.2	16.7	33.2
Doctoral Universities	9.3	28.2	34.4	9.4	15.6	3.1
Public 4-Year Masters	20.9	46.1	15.0	10.5	3.0	4.5
Private Masters	42.8	32.2	21.4	3.6	0.0	0.0
Private 4-Year	54.4	29.5	13.2	2.9	0.0	0.0
Public/Private HBCUs	51.7	31.0	10.3	3.5	0.0	3.5
2-Year Colleges	65.3	19.5	10.9	0.0	0.0	4.3
Medical Colleges	26.6	26.6	33.4	6.7	0.0	6.7

million or more would be expected at universities, it is surprising to see that between 3 and 7 percent of the HBCUs, medical colleges, and two-year colleges also exceed $100 million in needs.

The availability of an updated national profile of *where* deferred maintenance is typically found by sector and college type will, hopefully, raise the interest of college administrators and governing boards in evaluating conditions at their institutions. Although national totals are useful in highlighting where the potential is greatest by sector and college type, the requisite for institutional leadership is to conduct a facilities audit to gain information more specific to facilities conditions on their campuses. Among other things, the results of an audit will indicate a college's capacity for eliminating, or at least reducing, deferred maintenance backlogs to manageable levels.

Deferred Maintenance by Facilities Type

The types of facilities that suffer the most from deferred maintenance are related to the characteristics of an institution. Urban colleges in compact settings will have less infrastructure needs than colleges in traditional campus-like settings. Residential campuses will have greater needs for residence and dining halls and student support facilities (student centers, athletic and recreation facilities, and parking garages) than those that primarily enroll commuting and non-traditional students.

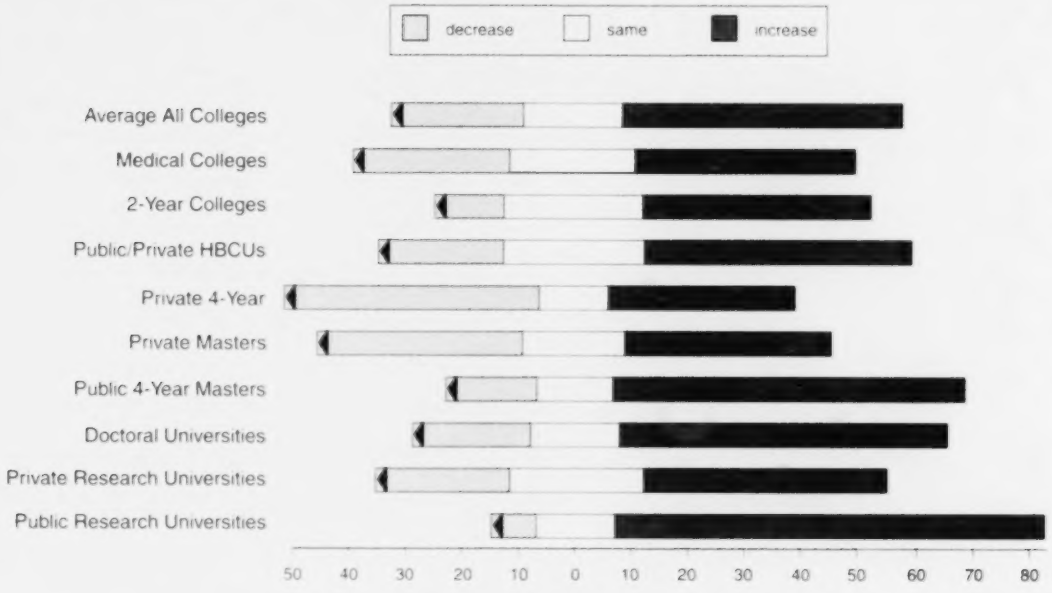
This information should be compared with that in Figure 8, which gave the distribution of facilities types at various college types. Over half the costs to eliminate deferred maintenance were attributable to just three types of facilities: classrooms, infrastructure, and residential.

Changes in Accumulated Deferred Maintenance Since 1988

The national total of deferred maintenance has increased since 1988. Although some campuses have reduced deferred maintenance backlogs, many others have experienced increases. Figure 13 shows that increases were more common than decreases in deferred maintenance for all types of colleges but the private baccalaureate and masters colleges.

Progress in recent years in reducing deferred maintenance backlogs at some institutions is counterbalanced by those with conditions the same or worsening. Discounting the "no answer" category, more than half of all college types reported that deferred maintenance increased or stayed the same since 1988. A positive note is that one-fourth of institutions of all college types reported decreases. Public research universities fare the worst, with less than 10 percent reporting a decrease. Here, the lack of

Figure 13 Changes in Accumulated Deferred Maintenance Since 1988



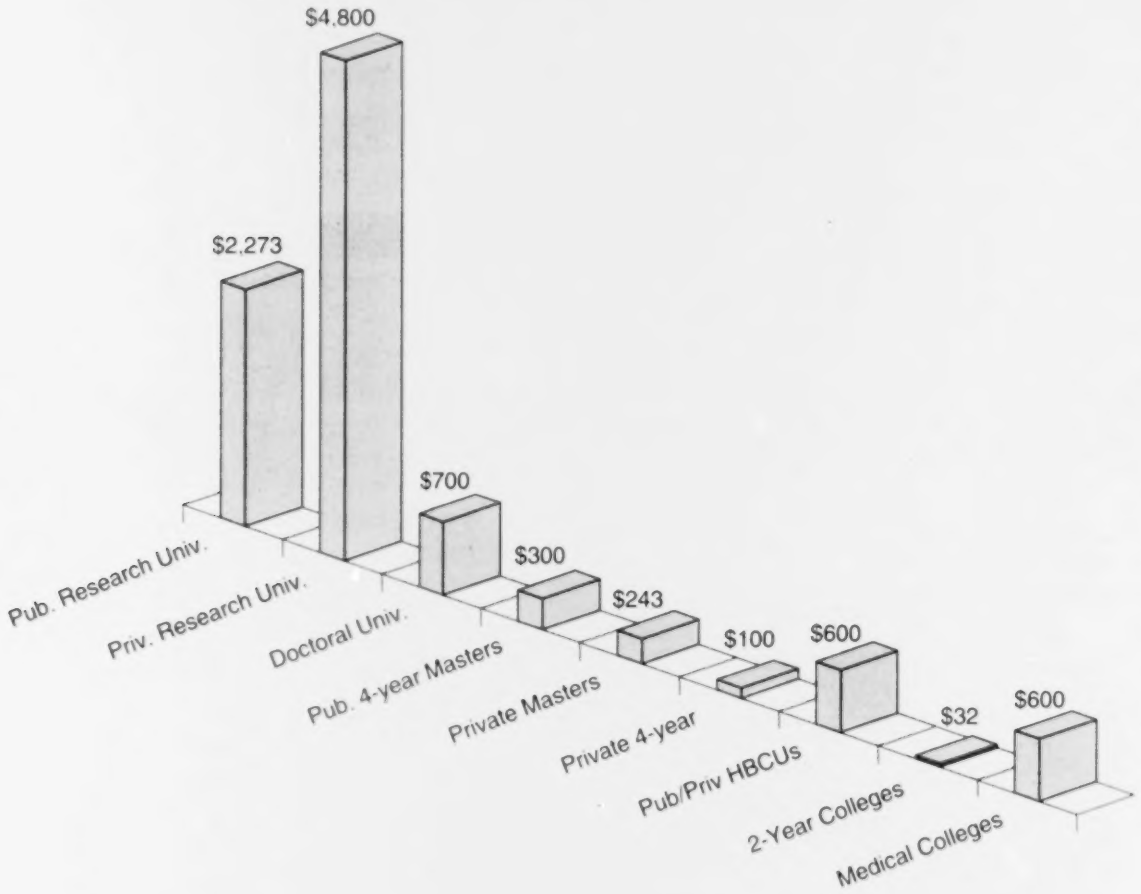
effective public policy strategies and budgetary restrictions hinder action. Private four-year colleges fare the best, a reflection of several factors including flexibility in budgeting practices and access to accumulated reserves unavailable to public counterparts and commitments to goals of competing more vigorously to attract and retain students, faculty, and staff.

Dollars Spent on Deferred Maintenance in 1994

Median college expenditures for deferred maintenance in 1994 were $329,000. Differences both *between* and *within* college types were fairly substantial (Figure 14). For example, private research universities spent a median of $4.8 million compared to two-year colleges' $32,000. Public research universities, with a median of almost $64 million in accumulated deferred maintenance and more than $15 million in urgent needs, spent $2.3 million in 1994. In comparison, private research universities, with less accumulated deferred maintenance and urgent needs (respectively, $60 million and $12 million) spent a median $4.8 million per campus.

Size of expenditures for deferred maintenance is an important benchmark for comparing allocations between institutions. However, the percentage of current fund expenditures for deferred maintenance is more significant. The portion of college E & G (education and general) bud-

Figure 14 Amounts Spent on Deferred Maintenance by College Type: 1993–1994 *(amounts in thousands)*



gets spent for deferred maintenance was very slight. Over two-thirds of colleges devoted less than 1 percent of their current fund expenditures to deferred maintenance projects and only 12 percent spent more than 3 percent of their total funds. With almost 30 percent of the institutions reporting costs to eliminate deferred maintenance that exceeded 23 percent of expenditures, campus decision-makers must turn to special allocations from institutional funds or external sources to fill the gap.

That there are rather large differences in expenditures on deferred maintenance within and between college types should not be too surprising, because colleges have considerably different annual current fund expenditures and their deferred maintenance amounts are quite different. Benchmarks for financial relationships explain how colleges differ from each other and provide measures for comparative analyses.

Deferred Maintenance Financial Benchmarks

Data on deferred maintenance backlogs, current fund expenditures, and current replacement value of facilities is necessary to comprehend differences between institutions and essential for capital budgeting and planning. With accurate data on hand, two important financial benchmarks can be calculated to determine where a college or university stands in comparison to its peers. These benchmarks will also establish a baseline of current conditions to analyze year-to-year changes in campus deferred maintenance.

- Facilities Condition Index (FCI)
- Deferred Maintenance Ratio (DMR)

Facilities Condition Index

The Facilities Condition Index (FCI), a ratio of accumulated deferred maintenance to current replacement value, is an important benchmark for comparisons to other institutions. The FCI is useful for setting annual goals for reducing deferred maintenance backlogs to manageable amounts. For example, alternative scenarios can be developed to achieve a certain FCI level after a period of years, or to set an annual funding level until a manageable level of deferred maintenance is reached. The FCI expresses the amount of spending necessary to eliminate deferred maintenance as a proportion of the total current replacement value of the physical plant. Another way to look at the FCI is that it represents the depleted value of an institution's physical plant. Once established as a credible number and used routinely in capital budgeting and planning, the FCI can be used to monitor actions to restore unsatisfactory conditions.

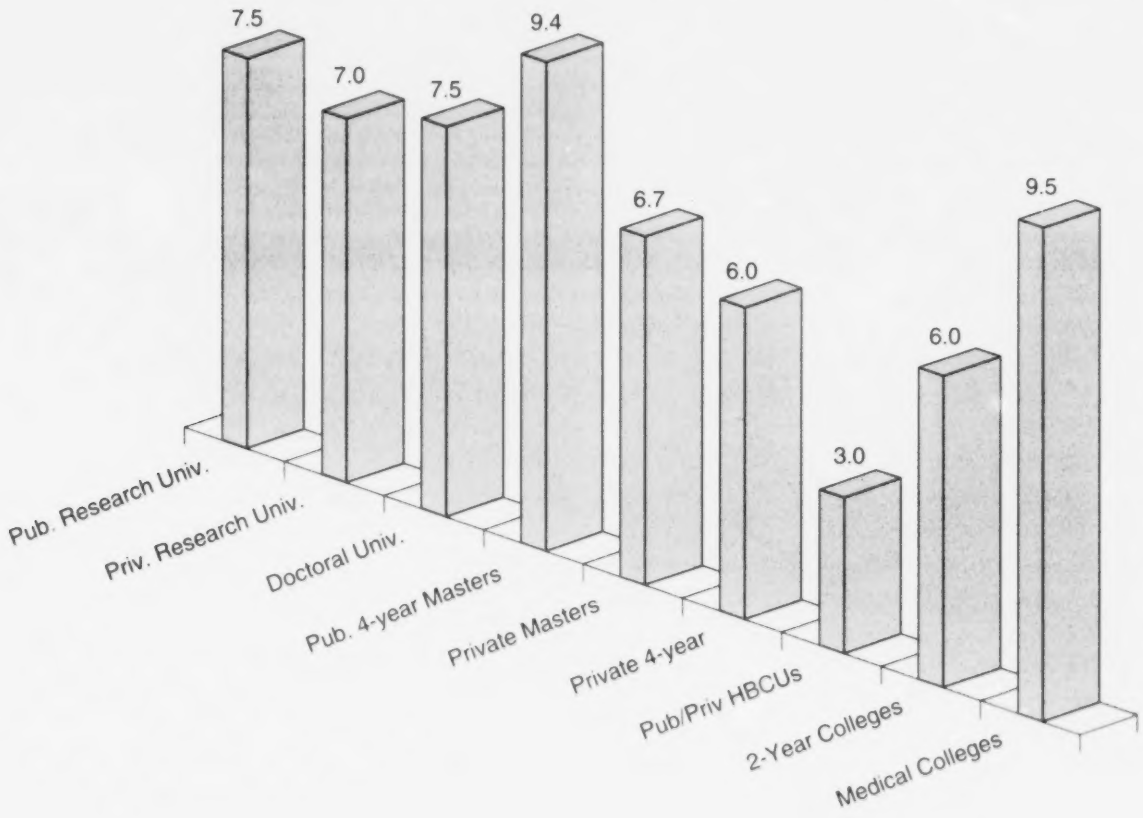
The FCI calculation is:

$$\text{FCI} = \frac{\text{Deferred Maintenance}}{\text{Current Replacement Value}}$$

The FCI for all survey respondents is *7 percent* (Figure 15). In other words, the amount that colleges would have to spend to eliminate deferred maintenance equals about 7 percent of their physical plants' value. A general guideline is that an FCI should be held below 5 percent and, under certain conditions, closer to 2 percent.[5] A detailed facilities audit is the best method to determine the desired target and evaluate opportunities to accomplish remedial work in a cost-effective manner.

Proper application of the FCI requires guidelines for the definition of the two components for valid comparisons between institutions and to develop trends in year-to-year changes in deferred maintenance. Prefer-

Figure 15 Facilities Condition Index, by College Type: 1994



ably, the index should include all data for a fiscal year for a complete view of institutional facilities condition and fiscal liabilities. Identifying the scope of the facilities used in the index's calculation is important. For example, does the index include buildings, grounds, fixed equipment, and infrastructure? Some institutions may prefer to evaluate conditions for *all* owned facilities, while others may only consider facilities funded by educational and general budgets or only for auxiliaries.

An institution's use of the FCI to justify resource allocation and requests for additional funding to supplement operating budgets requires thorough collection and analysis of facilities data. A thorough facilities audit process and an acceptable definition for current replacement value, including infrastructure, are essential for credibility in capital budgeting and planning. The facilities audit should be developed so that consistent results can be obtained from year to year.

Current replacement value (CRV) is the actual cost of replacing the facilities included in the assessment of deferred maintenance. It is *not* book value or an understated insurance value, but the current cost of replacing facilities to meet similar requirements and in compliance with current codes and regulations. The definition of CRV should distinguish whether only buildings or equipment and infrastructure are included and if auxiliary facilities are included in the total value.

Without an accurate national report of higher education's current replacement value, an estimate is necessary. Based on an average of $110 per GSF[6] multiplied by 4.1 billion GSF of building space, plus 25 percent of the calculation for infrastructure, the estimated current replacement value for higher education's physical plant is more than $500 billion.

Deferred Maintenance Ratio

A college's capacity to fund deferred maintenance needs from current fund operating budgets can be analyzed using a Deferred Maintenance Ratio (DMR) benchmark developed from education and general (E & G) expenditures and accumulated deferred maintenance.

The deferred maintenance ratio (DMR) calculation is:

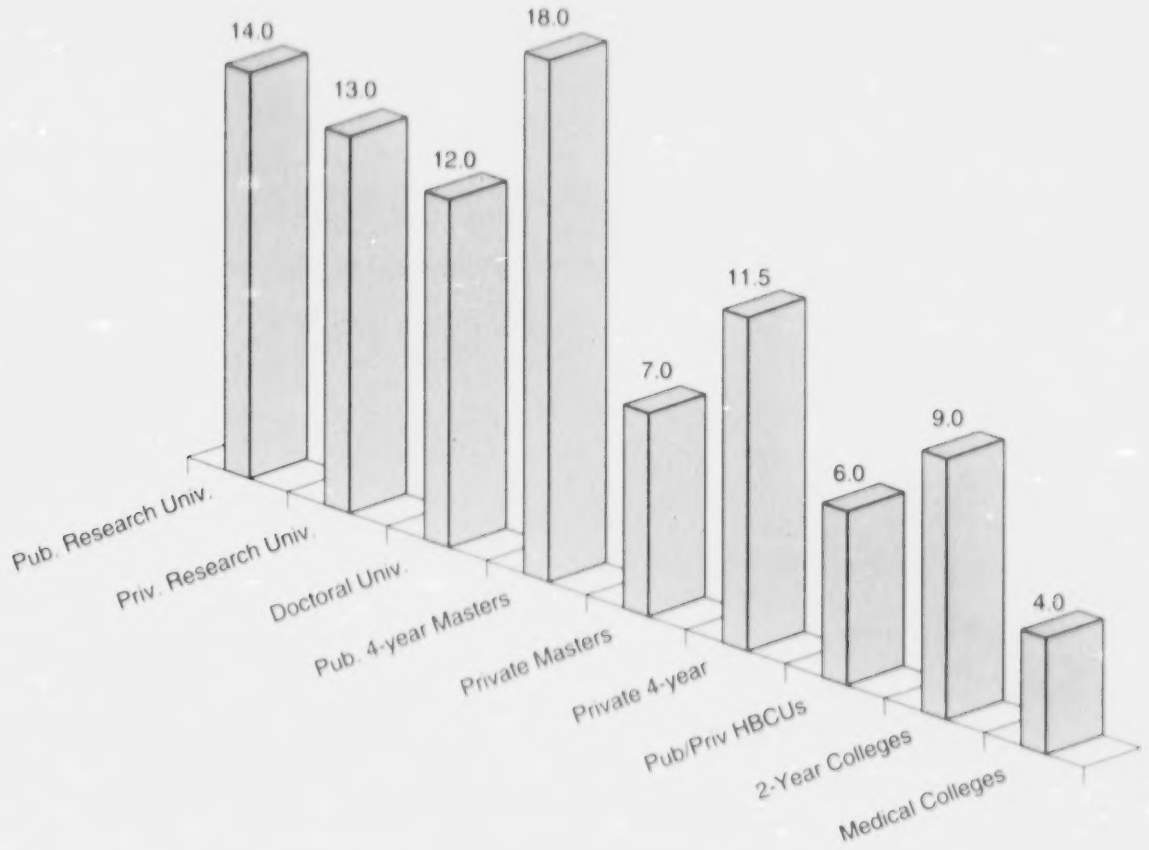
$$\text{Deferred Maintenance Ratio} = \frac{\text{Deferred Maintenance}}{\text{Current Fund Expenditures}}$$

The average DMR for all colleges and universities is *11.5 percent* (Figure 16). In comparison, the portion of college E & G budgets devoted to remedying deferred maintenance was very slight.

Further analyses of current fund E & G expenditures allocated for operations and maintenance (O & M) can guide capital budgeting and planning decisions. (A source for comparing an institution's O & M funding available for routine maintenance and capital renewal is data in APPA's biennial *Comparative Costs and Staffing Report for College and University Facilities.*)

A decline in O & M funding during the past 15 years suggests that proportionally smaller amounts of current funds expenditures were allocated for maintenance and capital renewal. In 1980, O & M budgets were 8.4 percent of total E & G expenditures and by 1993 were 6.5 percent, representing a reduction of 30 percent during the period. Only 60 percent of O & M budgets typically is spent for maintenance and its administration. The remaining 40 percent includes non-maintenance items, such as utilities, housekeeping, managing solid and hazardous wastes, and security. The actual amount, therefore, is now around 4

Figure 16 Deferred Maintenance Ratio, by College Type, 1994



percent of E & G expenditures. This calculation can be compared to a recommended 2 to 4 percent of current replacement value for routine maintenance *and* capital renewal.[7]

Analysis of institutional budgeting practices would generally support the conclusion that capacity for additional funding for urgent deferred maintenance needs does not exist in current fund O & M budgets. Unless special allocations were made from institutional funds or external support was available, this provides a partial explanation for current levels and, in some cases, increases in accumulated deferred maintenance.

Actions to Reduce Deferred Maintenance

In addition to gathering data on the cost of accumulated deferred maintenance, the survey explored actions taken to reduce deferred maintenance backlogs and, where results proved successful, what factors

influenced success. Five actions were selected for the survey that suggested the most potential for reducing deferred maintenance backlogs:

- Undertaking strategic facilities planning to prioritize needs
- Making more funds available for facility upkeep
- Earmarking a certain amount in budgets for accumulated deferred maintenance (ADM)
- Delaying or canceling new construction
- Raising funds for maintenance endowments for new buildings.

Colleges that reported taking the actions achieved a positive impact on reducing accumulated deferred maintenance, and were more likely to have their deferred maintenance fall and less likely to report increased deferred maintenance than those not taking the actions.

The survey specifically asked which of these actions an institution had taken to address its accumulated deferred maintenance. In order of percentage of implementation, the following had positive results.

Strategic Planning

Colleges that undertook strategic facilities planning to prioritize needs, combined with an increase in facility funds, showed the greatest success in reducing accumulated deferred maintenance. Strategic facilities planning includes a comprehensive review of all capital needs. A necessary component is a facilities audit to determine capital renewal needs, including deferred maintenance backlogs. Prioritization of needs enables an institution to plan for allocation of resources and, when necessary, to seek external funding.

An average of three-fourths of the colleges reported undertaking strategic facilities planning. The proportion was greater for private than public institutions. While just more than half the colleges engaged in strategic facilities planning experienced increases in accumulated deferred maintenance, those taking the action saw more positive results than those that did not.

Increased Facility Funds

Increased funding for facility upkeep has the effect of directly addressing both accumulated deferred maintenance and capital renewal. An obvious approach to reducing backlogs, only half the survey respondents reported taking this action. The greater flexibility in budgeting practices of private institutions was evident in the differences between sectors. Private institutions exceeded their public counterparts at all col-

lege levels. Those colleges that did increase facility funding saw a substantial benefit in the reduction of deferred maintenance backlogs.

Earmarked Budget

Allocating funds by earmarking a certain amount in the budget for deferred maintenance had effects similar to an increase in funding. However, the survey responses indicate less success with this action. Although earmarking in a budget is an important action, the amount designated must be large enough to have a significant impact on backlog reduction.

Delaying or Canceling New Construction

New construction may be postponed or canceled in order to make funds available for deferred maintenance. This can be an important gesture that signifies a shift in priorities to address existing facilities conditions. The major challenge is to transfer funds from one category to the other. Possibility for delay or cancellation depends on several factors including status of a project, legal and financial procedures, and overall costs and benefits of the action.

There are several salutary effects of shifting priorities from capital construction to renewal. First, there is clear evidence to a college's constituencies that the condition of existing facilities has taken a priority over new construction. Second, taking this action may help external funding sources understand that significant capital renewal needs must be addressed. Finally, when possible, a shift from new construction to capital renewal can transfer funds previously not available for capital renewal.

Maintenance Endowments

There is a popular view that the way to fund capital renewal and, consequently, to avoid deferred maintenance is to create a maintenance endowment for a new facility. The concept is practiced routinely for projects funded through bonds by the requirement of a maintenance reserve for future renewal. Although an enviable goal, relatively few survey respondents had taken this action, with private institutions experiencing greater success than public ones. The primary difference is in the practice of raising funds for facilities from private sources versus appropriations from public agencies.

Factors Beneficial to Addressing Deferred Maintenance

The survey identified five possible factors that can cause change and influence treatment of accumulated deferred maintenance. Respondents were asked which factors contributed to the institution's success (or

failure) in addressing its deferred maintenance problem and whether their influence was positive or negative (beneficial/detrimental). Those factors that were judged beneficial were ranked as follows:

- Priorities of top administrators (80 percent)
- Support of trustees or legislators (73 percent)
- Budgetary and/or financial strategies (59 percent)
- Financial condition of the institution (46 percent)
- State appropriations (24 percent).

The most beneficial situation, deferred maintenance as a high priority for senior administrators, confirms the view that current unsatisfactory facilities conditions will continue to prevail unless campus leadership commits itself to addressing the problem. Surveys during the past five years of several of the higher education's constituencies regularly place the adequacy of physical plant in meeting current needs as among the top two or three most critical concerns. These opinions are reported by trustees by the Association of Governing Boards of Universities and Colleges (AGB), college presidents by the American Council on Education (ACE), statewide higher education executive officers (SHEEO), chief financial officers by NACUBO, and chief facilities officers by APPA.

Converting concerns to action is a major goal of this report. The data, conclusions, and suggested policy implications can fortify campus leadership, governing boards, coordinating agencies, and legislators in placing high priority on deferred maintenance. When coupled with advocacy and/or support by governing board members and legislators, senior administrators have encouragement for the difficult process of measuring needs, allocating resources, and seeking necessary additional funds.

Deferred Maintenance at Historically Black Colleges And Universities

Those colleges and universities founded for black Americans face many of the issues that confront all institutions of higher education. Similar in many characteristics and in physical appearance to other institutions, there are special facilities problems at historically black colleges and universities (HBCUs) that arise from their unique histories, changes in their relationships to their traditional constituencies, and, for some, vestiges of segregation.

HBCUs were selected as a college type in the survey to distinguish their special role in American higher education. The survey grouped all HBCUs

in one category and did not include them in other college types, therefore, data for the HBCUs is presented only once and is not double-counted. Although there were survey responses from more than one-third of the 103 HBCUs, large and complex institutions have more resources to produce data on facilities conditions than other college types. The smaller size of most HBCUs, with 80 percent of enrollments at campuses with less than 5,000 students, places limits on resources for facilities management sufficient to monitor and assess their capital renewal and deferred maintenance needs.

In 1993, HBCUs enrolled 217,462 FTE students at 50 public and 53 private institutions, representing 1.5 percent of the national total of 14.2 million students. Although public HBCUs are slightly less than half the total institutions, almost 75 percent of the students attended them. HBCUs have relatively small enrollments compared to other college types. Half of the campuses enroll less than 1,000 students and only 20 campuses enroll more than 5,000 students, of which four average between 10,000 and 11,000 students. Recently, shifts in patterns of enrollment include an increase in the percentage of women and non-minority students and growth in all college types. An exception to the growth is a 50 percent decline in private two-year colleges, with an enrollment total of less than 1,000 FTEs at four institutions in 1993.

Total space of 138 million GSF at the HBCUs represents 3.5 percent of all higher education space. With enrollment at HBCUs accounting for only 1.5 percent of students, this suggests that there is a surplus of space. Indeed, this may be case at some institutions. However, ***capacity*** should not be evaluated without considering the ***quality*** of space and its ability to support missions at individual institutions.

Age and condition of facilities, evidenced by histories of construction and renovations and accumulated deferred maintenance, determine the ability of facilities to support missions. Median age of space constructed at the HBCUs is 28 years, the same as the median age for all college and university space. The peak decade of construction was the 1970s, with 25 percent of total space added during those years. By 1980, 80 percent of today's campus space was in place.

HBCUs reported an average of $6.3 million in accumulated deferred maintenance at each campus, of which $1.9 million was the cost to eliminate urgent deferred maintenance. Total deferred maintenance for all HBCUs was almost $500 million, with $144 million needed for urgent needs. HBCUs spent an average of $600,000 at each campus on deferred maintenance; 75 percent of the institutions reported that deferred maintenance had either increased or stayed the same since 1988.

For several reasons, the amounts for total and urgent deferred maintenance for historically black colleges and universities (HBCUs) are probably understated. Because of unsatisfactory facilities conditions, some HBCUs are at risk or are limited in their ability to meet their missions adequately.

Historic patterns of facilities maintenance funding and maintenance management probably has contributed to the deferred maintenance backlogs, along with the quality of construction. Only within the past 15 years did facilities funding for the public HBCUs reach equity with other institutions. Recent funding for public HBCUs that enroll 75 percent of HBCU total enrollment, in many cases, has not been sufficient to compensate for past patterns of inequitable funding. The median age of facilities at 28 years also suggests the potential for accumulated deferred maintenance. Although relief of some of the accumulated deferred maintenance problem has occurred with spending in 1995 of an average of $600,000 by each HBCU, it is undetermined whether this expenditure is typical or if it reduced backlogs of deferred maintenance.

Finally, evidence from surveys conducted for higher education civil rights lawsuits (e.g., *United States v. Fordice*) indicates that probably much higher levels of deferred maintenance exist than the amounts reported in the survey. Substantial backlogs of infrastructure problems are a plausible contributor to an understated amount of total and urgent deferred maintenance.

Notes

5. Kaiser, Harvey H. *The Facilities Audit*. Alexandria, Virginia: APPA, 1993. p. 46.
6. R. S. Means. *Building Construction Cost Data, 1996*. Kingston, Massachusetts, 1996.
7. Kaiser, Harvey H. "Preventing Deferred Maintenance." *AIPE Facilities*. September/October 1995.

Chapter 4

Conclusions

The 1995 APPA/NACUBO/Sallie Mae survey of the condition of higher education facilities illus-trates that where determined lead ership placed deferred main-tenance as a priority on its agenda, action and positive results followed. However, the survey also shows that there is a growing gap between those institutions with the will and the ability to find the means to reduce deferred maintenance back-logs and those that have taken little or no action. Much more must be done to encourage legislators, statewide system administrators, campus leadership, and supporters of higher education to develop public policy goals and allocate sufficient resources to restore facilities to acceptable conditions.

The following policy implications are framed as guides to those persons involved in addressing accumulated deferred maintenance and who will shape the agenda for higher education's facilities and prepare the way for action.

A Foundation to Uphold. The public sector of governments and the private sector of corporations, foundations, and individuals have provided a foundation for higher education for the benefit of all members of the American society. These sectors have an obligation to continue to uphold colleges and universities at adequate financial levels to assure that all individuals have access to an advanced education in safe and healthy, functional, and attractive environments. Both sectors must not only continue their support at adequate levels; they should strive to be leaders in the improvement of campus environments by establishing policies addressing the condition and adequacy of facilities, assisting campus leadership in meeting its stewardship role, and providing necessary resources for reinvestment in capital plant. ❶

In many instances, past commitments to this obligation to uphold the foundation of higher education have enriched the lives of individuals, helped to secure America's place in a competitive global economy, and created flourishing national, regional, and local economies.

Higher education is held in public trust by institutional leadership and is strongly dependent on public policy for its sustenance. Differing from the focus of business on return of investment, higher education exercises a stewardship of institutional resources through its primary mission of providing instruction, research, and public service programs.

Stewardship of higher education is a shared responsibility of government, institutions, and the American society. Such stewardship means short-term and long-term management of facilities in the best interests of *students, faculty, staff, and other campus constituencies.* Delaying the reduction of deferred maintenance to institutionally manageable levels passes on a debt to future generations of students.

❷ **The Effects of Deferred Maintenance on Higher Education.** The estimated $26 billion in accumulated deferred maintenance—with $5.7 billion in urgent needs—threatens the ability of higher education's facilities to support college and university missions. Backlogs of deferred maintenance will continue to grow unless adequate resources are available for capital reinvestment and steps are taken to ensure safe, functional, and well maintained facilities.

The condition of facilities often determines the ability of faculty and staff to deliver their services and meet their goals and objectives. Although no institutions will close their doors due to deferred maintenance alone, unsatisfactory facilities conditions are a threat to fiscal stability.

The critical need for support is evidenced by the estimates of accumulated deferred maintenance nationally and by college types. The inability of institutional funds to meet the obligations of many needs for reinvestment in facilities creates a momentum for recourse from federal and state governments. While the recourse to government may be considered by some as the only viable course of action, institutions have a responsibility to ensure that currently available resources are used effectively and efficiently.

The typical focus of attention to facilities conditions is on *buildings.* It is probable that estimates of accumulated deferred maintenance are conservative due to the omission of infrastructure from assessments of conditions. Inaccurate portrayals of costs for accumulated deferred main-

tenance will result from the omission of infrastructure in estimates of needs. Backlogs will continue to grow.

As a commitment to addressing capital renewal and deferred maintenance, institutions should ensure that operations and maintenance departments are held to demanding standards of accountability. The credibility of a maintenance department can affect the responsiveness of institutional leadership and external funding sources for claims of additional funding to adequately maintain facilities and to prevent deterioration. Unsatisfactory conditions will repeat themselves unless the maintenance management is held accountable for expenditures made for current fund expenditures and funds allocated for capital renewal and deferred maintenance.

Interdependent Policy and Decision-Making Roles and Responsibilities. Numerous governments, institutions, organizations, and individuals play distinct and important roles in shaping policies and in the decision-making process for college and university facilities improvements. These include: federal, state, and local governments and legislators; members of governing boards of statewide coordinating agencies and boards of trustees of institutions; system and campus administrators; campus constituencies of students, faculty, parents, and alumni; higher education associations; corporations, foundations, and other supporters; the media; and public stakeholders in higher education. These roles are interdependent. The decision-making process must ensure that all of these roles are preserved and balanced if our pluralistic higher education system is to address unsatisfactory facilities condition in a cost-effective, equitable, and timely manner. ❸

The following describes the interdependent roles and responsibilities of government, higher education, and public stakeholders.

The Role and Responsibilities of Government. Historically, the federal and state governments have upheld higher education by a mix of policies in regard to facilities improvements. While federal involvement has been in financial support for programs, student financial aid, and facilities construction and renovations, the primary responsibility for higher education in the United States has resided in the states. In the chartering of private colleges, the creating of publicly supported colleges and universities, and in planning and overall coordinating, state governments have provided initiative and funds, and some control over colleges and universities in their states. Local governments play a direct role in the support of public community colleges and indirectly through alleviating private institutions of property taxes.

The strength and quality of the nation's higher education system as a whole will depend in no small part on the ability of federal, state, and local officials to assist institutions to overcome unsatisfactory facilities conditions. All governments should recognize their obligations to sustain existing capital investments in colleges and universities to ensure that benefits from higher education to the American society continue to flow unimpaired. Higher education should recognize that, to varying degrees, the precedent of government support for current fund expenditures and investment in physical plants offers opportunities to explore options for support to improve facilities conditions.

That higher education is inextricably tied to public policy is a certainty. Scores of regulations have affected higher education with sometimes excessive demands for accountability and mandated actions that place fiscal burdens on institutions. Social and safety initiatives, from civil rights to employee pensions, from laboratory safety standards to removal of underground storage tanks, are justifiably within campus domains. During the course of meeting these obligations, higher education is beset by cumbersome and often duplicative reporting requirements from several agencies in both state and federal governments. Although there are extreme examples of inappropriate actions and egregious oversights that attract attention and demands for increased reporting, public policy should strike a balance between measuring performance and intrusive and burdensome reporting. In the case of public policy for support of facilities improvements, the higher education associations should act as partners in the development of accountability and performance reporting.

Policies to support improvements for higher education facilities must, necessarily, differ in deference to an institution's public or private status. Federal, state, and local governments have overcome distinctions in the past by providing direct assistance to institutions in several forms, including student aid, construction, fellowships and traineeships, and various categorical programs. As a result of these precedents, higher education should strive to forge a link between Washington and the 50 state capitals for a higher education facilities policy that addresses unsatisfactory facilities conditions.

The Role and Responsibilities of Higher Education. The diverse constituencies of higher education should establish priorities to guide effective policy-making to improve unsatisfactory facilities conditions. The many voices of higher education must ensure that a community of interests is developed that relates to conditions that need to be improved.

In particular, higher education associations can wield great influence to guide priorities and in determining the level of resources to be applied to eliminating or, at least reducing deferred maintenance to manageable levels. Collecting, analyzing, and disseminating information on conditions is a task well-fitted to the associations missions and should be adopted in partnership with governments, statewide coordinating agencies, and institutions.

The Role and Responsibilities of Public Stakeholders. Numerous organizations and people play an important and distinctive role in support of and the accountability to the nation by higher education. These include corporations, foundations, donors, the media, and the general public. These roles, while some acting independently, have both direct and indirect effects on higher education. The higher education community must ensure that all these public stakeholder roles are preserved and balanced if the academic enterprise is to remedy problems of unsatisfactory facilities conditions.

Institutional Commitment To Action: Strategic Facilities Planning. ❹ Statewide agencies and individual institutions must make difficult choices in allocating resources to support core missions and to reinvest in facilities. Institutional leadership must set priorities for reducing deferred maintenance backlogs. To begin the reordering of priorities and to gain the support of external funding sources, colleges and universities should undertake a process of strategic facilities planning as a component of overall campus strategic planning. A checklist of institutional strategies should include setting of priorities, preparing strategic facilities plans, assessing short-term and long-term implications of facilities requirements, identifying deferred maintenance and capital renewal and replacement needs, setting goals for reducing accumulated deferred maintenance, improving maintenance, and evaluating and improving effectiveness of space utilization.

Policy shifts can be guided by a deliberate process of overall institutional strategic planning that includes a *strategic facilities planning process.* Because deferred maintenance lingers as a major problem for many institutions, even after years of encouraging institutions to take action, a fundamental shift in institutional planning processes is necessary. Strategic facilities planning introduces the concept of *capital asset management* and shifts policy and operational decisions to a larger perspective of campus space needs and resource allocations.

Agreement by campus leadership and the governing board to address unsatisfactory facilities conditions is the appropriate starting point for initiating a strategic planning process. The process should focus on lead-

ership to champion the difficult resource decisions, design of the process, defining of all capital needs, the search for the means to improve unsatisfactory conditions, and solutions for the most urgent current problems. Most prominent in the decision to begin addressing unsatisfactory facilities conditions are the campus chief executive and senior administrative team. They should be highly visible champions of the process from beginning to end. Minimizing the vicissitudes of the campus resource allocation process can be handled by an inclusive process that enlists the support of campus stakeholders, including governing board members, alumni, and previous, current and prospective financial supporters.

There are difficult capital resource allocation choices to be made for many statewide coordinating agencies and private colleges and universities as higher education approaches the new millennium. These choices center on the management of capital assets to meet institutional mission, including acquisition through new construction, renovations, and reinvestment in facilities. A policy that emphasizes reinvesting in facilities may, in some cases, require shifting priorities away from new construction. Deferred maintenance backlogs will continue to grow at many institutions unless a determined effort is made to use the maximum amount of available capital resources for reinvestment.

The following is a checklist of strategies that guide an institutional commitment to action to eliminate or, at least, reduce deferred maintenance backlogs to manageable levels and to prevent future facilities deterioration.

- Build a constituency of campus support
- Develop a strategic facilities plan
- Identify conditions of capital assets (buildings, grounds, infrastructure, and equipment) by conducting a facilities audits and an assessment of overall conditions
- Prioritize critical deferred maintenance needs
- Develop space optimization plan that evaluates existing space utilization and future program requirements
- Develop a master plan organizing land use, circulation, new facilities, and removal of existing facilities
- Assess short-term and long-term implications of facilities requirements
- Create public awareness of facilities conditions and funding needs

- Develop multiple funding sources for accumulated deferred maintenance and capital renewal
- Adjust campus capital expenditure priorities from new construction to capital renewal
- Fund maintenance and repairs at adequate levels to avoid accumulations of deferred maintenance
- Improve maintenance management to effectively and efficiently use current fund budgets.

Financial and Facilities Management. Institutional financial managers and facilities administrators should assist institutional decision-makers in considering the broad and long-term consequences of resource allocation that affect facilities. These managers have interrelated responsibilities to collect, analyze, and disseminate information; develop financial and facilities management plans; implement and control those plans; and evaluate plans. Financial and facilities managers should act in a harmonious manner to achieve objectives for maintaining facilities within the context of institutional mission and objectives. ❺

It is essential that financial and facilities officers ensure that capital improvement programs include accumulated deferred maintenance and capital renewal and are integrated into overall institutional resource allocation strategies. Both of these institutional managers play an important role in advising senior administrators and campus stakeholders on facilities conditions. Both the financial and facilities officers should act as partners with responsibility to fully apprise institutional decision-makers of the risks involved in not addressing capital reinvestment in facilities.

The functional area of facilities management should be the primary source of information on existing conditions and should have the technical capabilities and/or resources available to perform data collection and analysis. Facilities administrators need to exercise judgments about the relative priorities and urgency of capital renewal and deferred maintenance within the context of overall institutional financial conditions. It must be recognized that facilities managers, at whatever organizational level they function, cannot act in a completely independent fashion. Campus leadership should ensure that both financial and facilities managers act interdependently and share a common concern for the campus physical plant.

At many institutions, chief financial officers must determine and recommend priorities for resource allocations to campus leadership. If, in their belief, facilities requirements exceed the current or projected resources

available, it is their job to recommend which requirements should not be funded. Nonetheless, it should be recognized that budget tradeoffs may be necessary to avoid risks to personal safety and property, liability for failure to comply with regulatory requirements, and future and more costly capital renewal work because of deferrals of maintenance.

Facilities officers should determine the appropriate resources necessary for operations and management and seek those resources to ensure avoidance of deferred maintenance. In turn, they must develop and maintain a credible and cost-efficient maintenance program aimed at avoiding deferred maintenance and excessive capital renewal costs. Often, institutional responses to a call for deferred maintenance and capital renewal expenditures results in frustration, cynicism, and pessimism for facilities administrators because of past maintenance performance and inaccurate portrayals of facilities conditions. Facilities managers, acting interdependently with finance managers, should develop strategies to address past underbudgeting of maintenance and subsequent facilities neglect.

6 **Leadership for a Diversity of Institutions.** Essential to successfully addressing higher education's deferred maintenance and capital renewal problem is leadership by advocates who recognize the impact of unsatisfactory facilities conditions on an institution's mission. The diversity of higher education institutions presents a special challenge for a comprehensive set of recommended actions for facilities reinvestment that fits all institutions. The associations representing higher education constituencies should take an active leadership role in advocating resource allocation for deferred maintenance and capital renewal.

The attitude that must frame the strategic facilities planning process is one of *stewardship*. The principal ingredient of successfully addressing deferred maintenance is the leadership of individuals who recognize the problem and take action. There is no single answer to where and how this occurs, but the most important factor is that leaders—sometimes in legislatures, statewide coordinating agencies, governing boards, and on campuses—identify that the addressing of unsatisfactory facilities conditions is a high priority.

Experience in public systems, for example, in Florida, Virginia, Missouri, and North Carolina, resulted in concerted efforts to provide additional pools of money for repairs and renovations. Private institutions, such as Boston College, Syracuse University, Northwestern University, and Vanderbilt University have allocated reserves, shifted budget priorities and/or borrowed to reduce deferred maintenance backlogs. In these cases, college presidents, heads of statewide coordinating agencies, and,

sometimes, governing board members took unpopular positions and persevered until funding priorities were changed.

The collaboration that resulted in the publication of this book is an example of the leadership role that is appropriate for the higher education associations. The dissemination of the findings of the survey should be followed by development of an agenda by the associations for further actions. The agenda should include informing and encouraging statewide agencies and institutions to take action if they have not yet measured their deferred maintenance and provided funds to correct unsatisfactory facilities conditions. Such leadership action can include providing updates to the 1995 survey, ongoing dissemination of information through publications, and presentations at association meetings, legislative hearings, statewide agency meetings, and governing boards.

In the selection of financing alternatives for funding accumulated deferred maintenance, institutions should recognize that, typically, multiple sources will be necessary to accomplish the task. There are several alternatives for financing deferred maintenance, depending on whether an institution is in the public or private sector, the costs to eliminate or reduce deferred maintenance to manageable levels, the ability to change institutional resource allocation priorities, opportunities for funding from institutional reserves or other funds suitable for redesignation, access to external sources for gifts and grants, and capacity for borrowing. Preferably, these funding alternatives shift in emphasis from imposing a minimal burden on current operations, to various means of obtaining "free money" (e.g., gifts or grants), and culminating in seeking other external funds through loans or borrowing that impose some debt burden on an institution.

Alternative financing strategies for accumulated deferred maintenance include reallocation of institutional priorities in the development of operating budgets, generating revenues form sale or lease of assets for special designation for reinvestment in facilities, use of institutional reserves, redesignation of quasi-endowment funds, grants and gifts, loans, and borrowing. The preferable alternative is the one that costs the institution least in terms of a shift of internal resources that does not unduly detract from core mission support.

Dependable Funding Sources for Capital Reinvestment. The gap between institutional funding capacity and capital needs for deferred maintenance and annual capital renewal is increasing for many institutions. Colleges and universities with estimated costs to eliminate deferred maintenance exceeding 5 percent of the current replacement value

of the physical plant, typically must find external sources of funding for capital reinvestment. Declines in funding for operations and maintenance should be reversed to prevent future accumulation of deferred maintenance. Funding for deferred maintenance and capital renewal should provide a dependable source and flexibility in institutional management of expenditures and ensure that adequate resources are available to reduce deferred maintenance backlogs to manageable levels.

The lack of adequately funding major maintenance in operating budgets is the primary cause of the deferred maintenance backlogs now facing many institutions.

Accumulated deferred maintenance is a direct result of this shortfall in funds to maintain and to reinvest facilities. It is evident that consistent underfunding leaves little room for funding to eliminate or even reduce deferred maintenance backlogs to manageable levels. In addition, levels of accumulated deferred maintenance experienced by many colleges and universities would exceed current fund operations and maintenance (O & M) expenditures and, in many cases, consume several years budgets. Unless there are dependable sources of short-term funding for reducing deferred maintenance backlogs and long-term funding of capital renewal, unsatisfactory facilities conditions will continue to remain a pervasive problem for higher education.

8 **The Role Of Data Collection in the Capital Decision-Making Process.** The identification and characterization of accumulated deferred maintenance and capital renewal needs are essential parts of shaping national policy and institutional decision-making for facilities-related issues. Institutions are the primary source of data on facilities conditions. Efforts by governments, statewide coordinating agencies, and higher education associations should focus on consistency in data collection and uniform presentation of findings, while minimizing burdens on collecting agencies and responding institutions. Systematic and regular reporting should reflect monitoring of conditions by facilities audits, budgeting and project priorities, expenditures, and changes in levels of unsatisfactory conditions. Future facilities data collection and analysis that build upon the 1995 survey protocol and methodology would create a comprehensive database of benefit to higher education policy-makers and institutional decision-makers.

Financial lenders will especially benefit from data that will enable them to design instruments to bridge the gap in government support. Data collection at a national level should be designed to provide an overview of national conditions and also be useful for statewide coordinating agencies and individual institutions. A partnership between interested par-

ties, including federal and state governments, statewide higher education coordinating officers, higher education associations and institutions, would ensure that data collection is done efficiently, collects information useful for institutional strategies to reduce deferred maintenance backlogs, and provides a minimum burden to responding institutions.

A systematic approach for data collection and condition assessment will require guidelines and definitions developed with clarity and ease of understanding to ensure reliable findings and usefulness as a reference source. Methodologies for data collection and reporting of findings should be established to ensure uniformity of information, especially for comparative studies between institutions. Uniform space design, assignment, and utilization standards would complement methodologies and assist in institutional analysis of alternative strategies for selection of priorities and implementation of programs.

Monitoring of conditions of facilities conditions should incorporate an overview of external forces affecting priorities including, public policy, societal interests, enrollments, and financing opportunities. Innovations in programs requiring new construction, additions, or alterations and new technologies should be assessed for their impact on priorities to remedy unsatisfactory facilities conditions.

Space and Cyberspace. The uncertainties of the impact of information technology on capital asset management must be approached cautiously to ensure that facilities needs are prioritized within the context of a strategic facilities plan. Issues that should be addressed include:

- overall effect of distance learning on space requirements
- adaptability of existing space for new teaching methods
- changes in the traditional patterns of daytime classroom and laboratory use
- impact on campus attendance as faculty and students increase the use of electronic technology in the learning process
- impact of non-traditional students on demand for on-campus residence and dining services.

As a result of these and other forces, an increasing number of states are shifting capital priorities away from new construction by the use of space standards to test the need for a project. For example, requests for new construction by Texas public colleges are evaluated against rigorous de-

sign norms and utilization criteria for the type of facilities involved. This approach is also useful to emphasize priorities for capital renewal, termed in some states "repairs and renovations."

Information technology issues facing higher education create uncertainty in calculating space needs by traditional enrollment-driven methods. This calls for new analytical techniques to guide the selection of facilities priorities. An element of uncertainty related to enrollment growth in planning future space requirements is in the non-traditional student component of the projections. For example, weekend degree programs that use existing otherwise idle facilities and require little or no residence in traditional campus settings is increasingly popular. Another element is the potential impact of electronic technologies. The learning process is being affected by distance learning that has the potential to produce "classroom-less" campuses. Finally, there is the public distress about the cost of a college degree that may turn potential students to other sources for learning experiences.[8]

The strategic planning process is essential in defining institutional policies related to applications of information technology on space needs and the utilization of existing space.

Final Note

The 1995 survey provides important data to aid the higher education community and its constituencies in addressing accumulated deferred maintenance. A substantial portion of colleges face large and increasing deferred maintenance problems on their campuses, although problems are not universal. There are serious predicaments at masters and baccalaureate, two-year, HBCUs, and medical colleges. The most serious challenges are located at the largest research and doctoral universities. Unless these problems are addressed, their ability to continue to lead the world in academic achievement is severely threatened.

Higher education associations can wield great influence to guide effective policy-making to eliminate, or at least reduce, deferred maintenance to manageable levels. The many voices of higher education must ensure that a community of interests is developed to remedy unsatisfactory facilities conditions.

Federal, state, and local governments, corporations, foundations, and individuals must make a sustained commitment to continue to uphold higher education facilities to assure the vitality and success in meeting the missions of public and private colleges and universities. Past com-

mitments to this obligation have enriched the lives of individuals, helped to secure America's place in a competitive global economy, and created flourishing national, regional, and local economies. An ambivalent policy in regard to campus facilities conditions will hamper society's overall ability to gain what it seeks from higher education.

Notes

8. "$1,000 a Week: The Scary Cost of College." *Newsweek*, April 29, 1996. pp. 52–68.

Appendix A

The Survey Research Report

by

Jerry S. Davis, Ed.D.
Director, Education and Student Loan Research
Sallie Mae

Part I

Introduction

The Study Background

In 1989, nationwide attention was drawn to the deteriorating condition of America's college campuses by the publication of *The Decaying American Campus: A Ticking Time Bomb.*[1] That joint report of the Association of Physical Plant Administrators of Universities and Colleges (APPA) and the National Association of College and University Business Officers (NACUBO), in cooperation with Coopers & Lybrand, described several key findings from a 1988 survey of colleges and universities:

1. Between 1950 and 1988, college and university facility space had more than quintupled and represented 3 billion gross square feet (GSF) of classrooms, laboratories, libraries, offices, dormitories, and other space.
2. Colleges would have had to invest approximately $300 billion to reconstruct their facilities at the time of the study.
3. The deferred capital renewal and replacement needs of colleges were estimated at $60 billion.
4. Priority repairs and renovations or "urgent needs" would have required an estimated $20.5 billion of the total $60 billion.
5. Reinvestment in facilities had not kept pace with growing needs, with $4 of deferred maintenance accumulating for every $1 spent.
6. Classroom, laboratory, and library space were the three most frequently cited construction and renovation priorities.
7. Most institutions relied on tax-exempt bonds and state funding to finance their capital needs.

In the years since publication of *The Decaying American Campus*, APPA and NACUBO members observed substantial growth of campus facilities, but they also saw increases in accumulated deferred maintenance. Moreover, the passage of the Americans with Disabilities Act of 1990

added to campus needs for renovation or adaption of existing facilities. The creation of new "high tech" technologies for instruction and research have led to the need to modify campus infrastructures. These and other events led to increased interest in replicating the earlier study, to again "benchmark" the status of facilities on American college campuses.

APPA (now called APPA: The Association of Higher Education Facilities Officers) and NACUBO began discussions with Sallie Mae concerning doing a new capital renewal and deferred maintenance study. These discussions, which began in late autumn 1994 and continued through the winter, led to Sallie Mae's agreement to provide the study staff for a new research project.

The Study Purposes and Methodology

The study staff decided to survey representative samples of colleges and universities in an attempt to achieve the following objectives:

1. To quantify in dollar terms the magnitude of deferred maintenance among colleges and universities in the United States;

2. To collect and analyze data that will provide a greater understanding of college and university physical plants and capital needs; and

3. To provide colleges and universities with "normative" data for use in comparing their situations to those of their peer institutions.

To achieve the study objectives, a carefully constructed sample of institutions, which was designed to represent most colleges and universities, was identified to be surveyed. There were two types of surveys. The first was a lengthy interactive computer diskette-based instrument that gathered voluminous amounts of data on facilities and finances. The second survey was a short telephone survey that collected only the data thought to be critical to the survey purpose. Paper copies of both surveys are reproduced in Appendix B of this report.

In an attempt to parallel the 1988 survey, the several college populations were identified according to their positions in the Carnegie classification for institutions of higher education.[2] Included in the classifications were:

(1) *Research Universities,* institutions that offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, give high priority to research, and award 50 or more doctoral degrees each year;

(2) *Doctoral Universities,* institutions that offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and award at least 20 or more doctoral degrees in one or more disciplines each year;

(3) *Masters Colleges and Universities,* institutions that offer a full range of baccalaureate programs, are committed to graduate education through the masters degree, and award at least 20 or more masters degrees annually in one or more disciplines;

(4) *Baccalaureate Colleges,* institutions that are primarily undergraduate colleges with their major emphases on baccalaureate degree programs;

(5) *Associate of Arts Colleges,* generally two-year institutions that offer associate of arts certificate or degree programs and, with few exceptions, offer no bachelors degrees;

(6) *Medical Schools and Medical Centers,* specialized institutions that award most of their professional degrees in medicine, but in some instances have programs for other health professional schools, such as dentistry, pharmacy, or nursing; and,

(7) *Tribal Colleges and Universities,* specialized institutions that are tribally controlled and located on reservations.

A special eighth category of institutions not identified in the Carnegie classification system was included, the historically black colleges and universities (HBCUs), which comprises mostly baccalaureate and masters colleges and universities.

Other specialized institutions were *NOT* included in the study population. These included theological seminaries, separate health professions schools, schools of engineering and technology, schools of business and management, schools of art, music, and design, schools of law, teachers colleges, and other specialized institutions such as graduate centers, maritime academies, and military institutes.

In addition to having a Carnegie classification, to be included in the study population of colleges, the colleges had to have completed a federal Integrated Postsecondary Education Data System (IPEDS) finance survey of current funds revenues and expenditures of institutions of higher education for 1993–94.[3] The study population was restricted to institutions that had submitted an IPEDS finance survey because a substantial proportion of the data required by the research had to be obtained from the IPEDS survey responses. This reduced the number of necessary data

elements for the computer diskette-based survey, which consequently reduced the workloads for participating colleges.

The study intent was to obtain data from enough colleges to compare institutional responses by whether they were public or private. This was important because facilities and facility financing vary considerably by institutional control.

Table I-1 displays the populations of colleges by their types of classifications, the number that received surveys, and the numbers that responded to either the original computer diskette-based survey (which was mailed to all sampled colleges) or the follow-up telephone surveys.

The computer diskette-based survey was mailed to all sample colleges in March 1995. The target recipients for the survey were facilities administrators who were members of APPA and business officers who were members of NACUBO. Where there were no APPA or NACUBO members on a campus, the surveys were mailed to the colleges' chief business or financial officers, or sometimes their CEOs. The cover letters accompanying the surveys were signed by Wayne E. Leroy, executive vice president of APPA, and Caspa L. Harris, then president of NACUBO. Responding colleges were offered a free copy of the executive summary

Table I-1 CRDM Survey Populations and Responses, By College Types

	College Pop.	College Samples	Computer Responses	Phone Responses	Total Responses	Response Rate
Pub. Research Universities	85	85	44	6	50	58.8%
Priv. Research Universities	39	39	15	6	21	53.8
Pub. Doctoral Universities	64	64	21	7	28	43.7
Priv. Doctoral Universities	44	44	4	6	10	22.7
Pub. Masters Universities	247	247	63	2	65	26.3
Priv. Masters Universities	251	251	27	6	33	13.1
Pub. Baccalaureate	138	138	6	3	9	6.5
Priv. Baccalaureate	502	502	66	7	73	14.5
Pub. Associate of Arts	999	384	36	8	44	11.4
Priv. Associate of Arts	410	139	9	2	11	7.9
Pub. Medical College	30	30	10	5	15	50.0
Priv. Medical College	21	21	2	1	3	14.3
Public HBCUs	47	47	5	17	22	46.8
Private HBCUs	51	51	3	11	14	27.5
Public Tribal College	21	21	2	0	2	9.5
All Colleges	2,949	2,063	313	87	400	19.4%

of the study report and a summary description of responses from their types of colleges, to serve as a norms reference group to evaluate their individual situations. All respondents were promised that no college's individual data would be identified in the report.

In April 1995, all non-respondents received facsimile messages from APPA and NACUBO urging them to complete the survey as soon as possible. By the end of May, about 250 colleges had returned their responses. Another follow-up facsimile message was sent to the non-respondents. Eventually, 313 of the 2,063 colleges returned their computer diskette-based surveys, for a response rate of 15.2 percent.

Because the number of responses was insufficient for several college types, the study staff decided to do a targeted follow-up telephone survey of some non-respondents. This was a scaled-down version of the original computer diskette-based instrument. Those actions added 87 complete telephone survey responses, to bring the overall response rate up to 19.4 percent, or 400 out of 2,063.

Because the final numbers of responses for some college types were insufficient for valid statistical analyses, some college types were combined. The final classifications and response numbers were as follows:

	Responses
Public Research Universities	50
Private Research Universities	21
Public & Private Doctoral Universities	38
Private Masters Universities	33
Private Baccalaureate Colleges	73
Public Masters and Baccalaureate	74
Public/Private Assoc. of Arts & Tribal	57
Public & Private Medical Colleges	18
Public & Private HBCUs	36
Total, All Respondents	**400**

When the numbers of responses were combined in this way, the percentages of the total number of respondents and their response rates were as follows:

	Percent of Respondents	Response Rates
Public Research Universities	13%	59%
Private Research Universities	5%	54%
Public & Private Doctoral Universities	10%	35%
Private Masters Universities	8%	13%
Private Baccalaureate Colleges	18%	14%
Public Masters and Baccalaureate	19%	19%
Public/Private Assoc. of Arts & Tribal	14%	11%
Public & Private Medical Colleges	4%	35%
Public & Private HBCUs	9%	37%
Total, All Respondents	100%	19%

It is readily apparent that response rates varied considerably among the different college classifications, with the research universities, doctoral universities, medical colleges, and HBCUs more likely than others to have responded. Public and private baccalaureate and masters colleges, along with the two-year colleges, were least likely to have responded.

How Respondents Differed From Non-Respondents

In any research involving samples, there is always concern as to whether the samples or, in this case, survey respondents, are representative of their respective populations. When the samples are statistically representative of their populations, it is reasonable to make inferences about the populations from sample data.

The responding colleges' fall enrollments for 1993–94 were compared to those of their respective populations (see supplemental Table I-A at the end of this chapter). There were no statistically significant differences (at the 0.05 level of significance) in the mean enrollments of six of the nine types of responding and non-responding colleges: public research universities, private research universities, doctoral universities, public four-year/masters colleges, private masters universities, and the public and private historically black colleges and universities (HBCUs).

The respondents for the other three types of colleges had larger mean enrollments than their respective populations, as follows:

	Respondents	Population
Two-Year Colleges	6,270	4,413
Private 4-Year Colleges	1,779	1,416
Medical Colleges	1,829	1,356

Next the responding colleges' mean annual total expenditures, mean total educational and general expenditures, and mean total revenues were compared to those means for their populations (see Table I-B). There were no statistically significant differences (at the 0.05 level of significance) in these mean values for the two types of research universities and the doctoral colleges. The mean values for the other types of respondents were significantly larger than the means for their respective populations. For example, mean total expenditures for six types of respondents exceeded mean total expenditures for their populations by these percentages:

Public/Private HBCUs	55%
Medical Colleges	52%
Two-Year Colleges	45%
Private Masters Universities	40%
Private 4-Year Colleges	39%
Public 4-Year/Masters	33%

It is readily apparent that these responding college types spent considerably more money than other colleges in their populations. They also had similarly larger revenues (see Table I-B). The third comparison of respondent and population characteristics involved the mean values of their land, buildings, and equipment (see Table I-C). The mean building replacement values for four types of responding colleges were not significantly different from the values for their populations: public research universities, private research universities, doctoral universities, and the medical colleges. The mean building replacement values for five types of responding colleges were significantly larger than the mean values for their respective populations, by these percentages:

Public/Private HBCUs	57%
Public 4-Year/Masters	46%
Private Masters Universities	41%
Two-Year Colleges	30%
Private 4-Year Colleges	28%

These responding colleges' mean building replacement values ranged from 28 percent to 57 percent more than the mean values for their populations. The colleges' mean land values were similarly related, with no significant differences in the values for responding research universities, doctoral universities, medical colleges, and public four-year/masters universities and the means for their respective populations (see Table I-C). Again, some types of responding colleges had larger mean values than the ones for their populations, by the following percentages:

Two-Year Colleges	79%
Private Masters Universities	78%
Private 4-Year Colleges	70%
Public/Private HBCUs	64%

The mean land values for these four types of responding colleges were much larger than the mean land values for their respective populations. These four types of respondents also had higher mean values for land and buildings, and greater total revenue and expenditures, than their populations.

Therefore, in general, the responding research and doctoral universities were representative of their respective populations and responding medical colleges were somewhat representative of all medical colleges. Although their mean enrollments were similar to those of their populations, the responding private masters universities, public four-year/masters universities, and HBCUs had larger revenues and expenditures, as well as more valuable physical plants, than colleges in their respective populations. The responding two-year colleges and private four-year colleges generally enrolled more students than did colleges in their respective populations, and they had larger revenues and expenditures and more valuable physical plants.

It is not particularly surprising that many responding colleges were larger and more affluent than other colleges in their populations. Nor is it particularly surprising that larger, more complex colleges were more likely to have responded to the surveys. Larger institutions tend generally to have larger facilities staff with sufficient resources to monitor and assess their capital renewal and deferred maintenance needs. Smaller institutions are less likely to have facilities staffs and the data to answer the kinds of questions posed by the surveys.

In reading the balance of this report, it is important to keep in mind how some respondents differ from their populations, lest one leap to unwarranted conclusions based on biased samples.

How the Study Data Are Reported

The research report is presented in five subsequent parts and several additional appendices. Part II describes how campus physical plants have changed since 1950, in terms of their values, sizes, and uses. Part III describes answers to survey questions on whether construction or renovation projects were in progress or planned for the near future, what types of facilities were or would be involved, how much space was being constructed or renovated, how much was being spent for these activi-

ties, and the source of funds for them. The part also identifies the colleges' top priority construction and renovation projects, by facilities types.

Part IV describes how accumulated deferred maintenance (ADM) has changed since 1988, what colleges have been doing to address their ADM situations, how much they are spending on ADM, how much of their ADM is considered urgent, how ADM is apportioned among different types of facilities, and how much it would take to eliminate ADM from all college campuses. Part V describes the actions colleges have taken in response to the passage of the Americans With Disabilities Act of 1990, how much they spent on campus alterations to comply with ADA, how much they think they will have to spend to achieve substantial compliance, and how long it will take them to reach that goal (if they have not already achieved it). Part VI offers a brief study summary and conclusions.

The text speaks of colleges responding to the surveys, rather than of persons who actually furnished the data. This convention was used to make the report easier to read. "Colleges" was used in the text as a generic and inclusive term for colleges and universities.

•

Because some of the study samples were biased, reference is often made to "respondents" rather than "colleges," as a gentle reminder to readers that the responses might not be representative of all similar types of colleges. When reference is made to "All Colleges" it means that the research results have been weighted by the study staff to provide the best estimate of the *population* value for the particular data element being discussed, for example, the dollar value of accumulated deferred maintenance across all colleges in the United States. In other words, the study staff has tried to provide its best population estimates from samples that sometimes did not represent their populations.

The "All Colleges" population in this report includes about 3,000 institutions, rather than the 3,600 campuses generally spoken of when all institutions of higher education are considered. As was mentioned above, only the medical colleges and tribal colleges among all the "specialized institutions" under the Carnegie classification system were included in this research.

This report makes comparisons to findings from the 1989 publication only when the study staff was confident that the comparisons were valid. The earlier study's respondent samples were biased in their own ways, so statements about or comparisons between *population* values based on the biased 1988 and biased 1995 samples would have been unwise.

A list of the names of colleges that responded to either of the two surveys is included in Appendix C. Appendix B contains a glossary of terms used in the survey and this report. Unless otherwise noted in the text or tables, the data are for the 1993–94 academic year.

Notes

1. Sean C. Rush and Sandra L. Johnson, *The Decaying American Campus: A Ticking Time Bomb*. Alexandria, Virginia: Association of Physical Plant Administrators of Universities and Colleges, 1989.
2. *A Classification of Institutions of Higher Education, 1994 Edition*. Princeton, New Jersey: The Carnegie Foundation for the Advancement of Teaching, 1994.
3. *Current Funds Revenues and Expenditures of Institutions of Higher Education, Fiscal Years 1985 Through 1993*. Washington: U.S. Department of Education, 1995.

TABLE I-A **Average Total Fall Enrollment, Population and Respondents, By College Types, 1993–94**

	Population			Respondents			
	N	Mean	S.D.	N	Mean	S.D.	Z
2-Year Colleges	518	4,413	6,548	54	6,270	7,051	2.08*
Doctoral Universities	105	12,112	7,060	36	13,350	7,674	1.05
Medical Colleges	48	1,356	946	17	1,829	1,127	2.06*
Private 4-Year	497	1,416	1,040	73	1,779	1,750	2.98*
Private Masters	251	3,326	2,367	33	4,033	2,671	1.72
Private Research	37	13,236	8,024	21	11,562	7,663	0.96
Public 4-Year/Masters	318	7,507	5,574	71	8,507	5,461	1.52
Public Research	86	25,496	9,916	50	26,874	9,831	0.98
Public/Private HBCUs	96	2,851	2,651	36	3,585	2,985	1.66

*Indicates that difference in means are significantly different, at the 0.05 level of significance.

Source: IPEDS Survey, 1994.

TABLE I-B **Total Expenditures, Total E&G Expenditures, and Total Revenue For Populations and Respondents, By College Types**

	Population			Respondents			
2-Year Colleges	**N**	**Mean***	**S.D.**	**N**	**Mean***	**S.D.**	***Z***
Total Expenditures	516	$17,048	18,406	55	$24,753	34,322	3.10**
Total E&G	516	$15,926	17,502	55	$23,232	32,513	3.09**
Total Revenue	516	$17,239	18,608	55	$25,229	34,528	3.18**
	Population			**Respondents**			
Doctoral Universities	**N**	**Mean***	**S.D.**	**N**	**Mean***	**S.D.**	***Z***
Total Expenditures	107	$145,691	65,504	38	$146,217	72,618	0.05
Total E&G	107	$118,980	61,471	38	$123,553	61,261	0.46
Total Revenue	107	$146,209	103,601	38	$147,685	72,893	0.09
	Population			**Respondents**			
Medical Colleges	**N**	**Mean***	**S.D.**	**N**	**Mean***	**S.D.**	***Z***
Total Expenditures	51	$230,067	176,008	18	$349,143	183,485	2.87**
Total E&G	51	$123,834	91,147	18	$164,269	97,170	1.88
Total Revenue	51	$228,409	175,966	18	$345,986	181,030	2.83**
	Population			**Respondents**			
Private 4-Year	**N**	**Mean***	**S.D.**	**N**	**Mean***	**S.D.**	***Z***
Total Expenditures	499	$21,156	16,699	72	$29,403	24,282	4.19**
Total E&G	499	$18,178	14,226	72	$25,084	20,503	4.12**
Total Revenue	499	$21,226	16,795	72	$29,562	24,600	4.21**
	Population			**Respondents**			
Private Masters	**N**	**Mean***	**S.D.**	**N**	**Mean***	**S.D.**	***Z***
Total Expenditures	247	$35,285	29,054	33	$49,294	44,000	2.77**
Total E&G	247	$31,147	25,568	33	$42,455	37,242	2.54**
Total Revenue	247	$35,489	29,129	33	$49,384	44,380	2.74**
	Population			**Respondents**			
Private Research	**N**	**Mean***	**S.D.**	**N**	**Mean***	**S.D.**	***Z***
Total Expenditures	39	$701,701	424,547	21	$641,550	425,951	0.65
Total E&G	39	$470,323	276,885	21	$411,865	285,259	0.97
Total Revenue	39	$705,851	432,196	21	$644,573	434,966	0.05
	Population			**Respondents**			
Public 4-Year/Masters	**N**	**Mean***	**S.D.**	**N**	**Mean***	**S.D.**	***Z***
Total Expenditures	322	$61,103	64,449	74	$81,612	125,758	2.74**
Total E&G	322	$52,676	54,840	74	$69,881	108,435	2.70**
Total Revenue	322	$61,712	65,273	74	$82,764	128,225	2.77**

Public Research	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Total Expenditures	83	$561,584	358,281	50	$607,597	411,648	0.91
Total E&G	83	$418,329	224,219	50	$454,062	260,059	1.13
Total Revenue	83	$567,193	362,122	50	$614,171	416,640	1.09

Public/Private HBCUs	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Total Expenditures	97	$34,694	46,038	36	$53,829	91,926	2.46**
Total E&G	97	$28,724	31,413	36	$42,587	55,950	2.65**
Total Revenue	97	$34,942	46,472	36	$54,292	91,432	2.50**

*Dollar amounts in thousands

**Indicates means are statistically significantly different, at least at the 0.05 level of significance.

Source: IPEDS Survey, 1994.

TABLE I-C Land, Building, and Equipment Values For The Populations and Respondents, By College Types

2-Year Colleges	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	434	$ 1,510	2,725	52	$ 2,702	3,474	3.15**
Book Value-Buildings	442	$14,482	17,293	53	$22,444	29,983	3.35**
Replacement Value-Buildings	376	$26,012	28,188	51	$33,954	41,080	2.01**
Book Value-Equipment	460	$ 4,934	5,794	53	$ 7,309	7,946	2.98**
Replacement Value-Equipment	362	$ 6,221	7,933	50	$ 7,640	9.962	1.26

Doctoral Universities	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	100	$ 10,936	10,733	37	$ 10,216	10,866	0.41
Book Value-Buildings	101	$116,597	77,118	37	$131,316	75,417	1.16
Replacement Value-Buildings	84	$246,933	174,246	30	$284,143	189,498	1.17
Book Value-Equipment	101	$ 44,752	35,957	37	$ 50,119	35,334	1.49
Replacement Value-Equipment	72	$ 66,968	61,327	24	$ 68,779	66,982	0.15

Medical Colleges	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	46	$ 5,499	6,538	17	$ 6,904	6,331	0.89
Book Value-Buildings	47	$107,111	84,658	17	$165,931	100,986	2.86**
Replacement Value-Buildings	33	$190,396	171,548	12	$224,854	124,703	0.70
Book Value-Equipment	47	$ 60,386	48,519	17	$ 97,833	56,564	3.18**
Replacement Value-Equipment	28	$ 69,668	61,291	11	$103,850	67,095	1.85

Private 4-Year	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	472	$ 1,428	1,753	67	$ 2,429	3,902	4.67**
Book Value-Buildings	481	$19,170	17,363	69	$30,278	28,529	5.31**
Replacement Value-Buildings	412	$49,328	47,347	58	$63,594	63,225	2.29**
Book Value-Equipment	480	$ 4,600	5,135	71	$ 6,818	8,125	3.64**
Replacement Value-Equipment	385	$10,055	13,860	58	$19,182	45,343	5.02**

Source: IPEDS Survey, 1994.

Private Masters	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	236	$ 2,542	3,164	33	$ 4,525	5,339	3.60**
Book Value-Buildings	239	$25,741	23,970	32	$37,049	39,180	2.67**
Replacement Value-Buildings	204	$65,556	56,175	30	$92,701	71,275	2.65**
Book Value-Equipment	240	$ 7,733	9,714	33	$11,588	20,221	2.28**
Replacement Value-Equipment	193	$15,472	18,106	30	$23,508	26,254	2.43**

Private Research	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	38	$ 45,367	102,166	20	$ 19,809	15,041	1.12
Book Value-Buildings	38	$395,768	280,331	21	$370,478	292,694	0.56
Replacement Value-Buildings	31	$984,089	761,337	18	$963,307	908,098	0.12
Book Value-Equipment	37	$155,742	144,907	20	$137,205	121,701	0.57
Replacement Value-Equipment	24	$314,490	386,290	15	$277,343	364,865	0.37

Public 4-Year/Masters	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	306	$ 4,497	6,689	71	$ 5,904	7,740	1.77
Book Value-Buildings	308	$ 57,476	57,695	72	$ 75,562	107,597	2.66**
Replacement Value-Buildings	240	$123,067	124,505	56	$179,767	247,685	3.41**
Book Value-Equipment	311	$ 18,495	22,171	72	$ 24,573	42,351	2.33**
Replacement Value-Equipment	201	$ 23,606	41,034	48	$ 44,814	96,552	3.58**

Public Research	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	83	$ 26,796	25,520	50	$ 28,761	29,175	0.54
Book Value-Buildings	83	$393,527	224,148	50	$424,832	248,590	0.99
Replacement Value-Buildings	66	$861,166	488,431	40	$917,333	571,455	0.73
Book Value-Equipment	83	$231,116	155,444	50	$245,968	168,986	0.68
Replacement Value-Equipment	51	$278,926	204,157	30	$304,577	218,976	0.69

HBCUs	Population N	Population Mean*	Population S.D.	Respondents N	Respondents Mean*	Respondents S.D.	Z
Book Value-Land	87	$ 1,793	2,839	32	$ 2,941	4,535	2.29**
Book Value-Buildings	88	$32,465	36,156	33	$ 48,088	57,415	2.48**
Replacement Value-Buildings	66	$69,117	87,956	25	$108,647	153,949	2.25**
Book Value-Equipment	87	$10,346	14,377	31	$ 17,506	29,456	2.77**
Replacement Value-Equipment	55	$10,842	12,948	20	$ 13,528	17,409	0.93

* Dollar amounts in thousands

**Indicates means are statistically significantly different, at least at the 0.05 level of significance.

Part II

The Growing American College Physical Plant

The survey asked respondents to indicate by decades when the facilities on their campuses were constructed by GSF. Table II-1 shows that about 22 percent of the total space was constructed before 1951, 12 percent was constructed during the 1950s, 26 percent was constructed during the 1960s, 18 percent in the 1970s, 15 percent in the 1980s, and the remaining 7 percent was constructed in this decade.

TABLE II-1 Percentage Of Gross Square Footage Of Campus Buildings Constructed In Recent Decades, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Before 1951	25.0%	29.5%	19.4%	16.4%	22.1%
1951–1960	14.7	13.0	17.2	11.0	12.9
1961–1970	27.5	22.1	32.0	28.3	29.5
1971–1980	15.5	15.7	16.5	21.3	13.6
1981–1990	12.2	13.7	9.7	17.4	13.5
1991–1994	5.1	6.0	5.2	5.6	8.4
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median Year	1965	1964	1965	1969	1966
Number	42	14	24	68	26

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Before 1951	35.5%	25.2%	8.1%	11.8%	21.8%
1951–1960	13.2	15.5	5.4	12.1	12.0
1961–1970	25.9	15.5	23.1	13.1	26.3
1971–1980	10.9	25.8	26.4	29.7	18.1
1981–1990	10.1	10.6	25.6	17.7	15.1
1991–1994	4.4	7.4	11.4	15.6	6.7
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median Year	1961	1967	1976	1975	1967
Number	62	8	46	12	302

Private four-year college campuses generally had the oldest physical plants, with 36 percent of their GSF constructed before 1951 and 75 percent constructed before 1971. The two-year college campuses generally had the youngest plants, with only 8 percent of their GSF constructed before 1951 and 37 percent constructed since 1980. Medical college campuses also had substantial proportions of their total GSF constructed since 1980.

Here are the percentages of total GSF constructed since 1980, for each college type:

Two-Year Colleges	37.0 percent
Medical Colleges	33.3 percent
Public 4-Year/Masters	23.0 percent
Private Masters Universities	21.9 percent
Private Research Universities	19.7 percent
Public/Private HBCUs	18.0 percent
Public Research Universities	17.3 percent
Doctoral Universities	14.9 percent
Private 4-Year Colleges	14.5 percent
All Respondents	21.8 percent

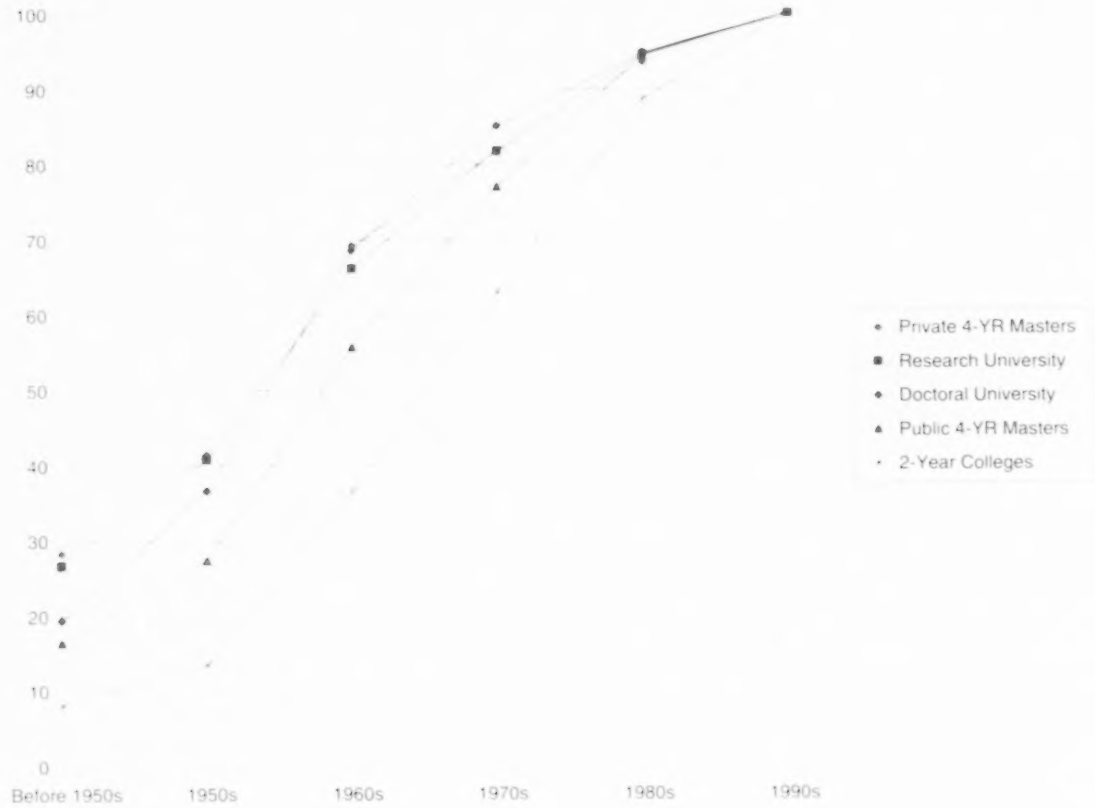
These data show that students are most likely to find relatively newer building space at the two-year colleges and medical colleges, followed by the public four-year and masters colleges and the private masters universities. They are least likely to find recently constructed building space at the doctoral universities and private four-year colleges.

Figure II-1 shows the cumulative percentages of gross square footage constructed by decades for five major college types. During the 1960s and 1970s, the private four-year/masters colleges, research universities, and doctoral universities added about the same proportions to their total campus GSF. By the end of the 1970s, these three college types had each constructed over 80 percent of their current total campus GSF. Public four-year/masters colleges constructed only 76 percent, and two-year colleges constructed just 64 percent, of their total GSF by the end of the 1970s.

Table II-2 shows the average GSF per building by their decades of construction, by college types. The respondents reported that the average GSF per building for all construction over all decades was about 27,000. The average for buildings constructed after 1960 was about 33,000 GSF. For buildings constructed by 1960, the average was just 22,000 GSF.

All but the public four-year/masters colleges reported larger average sizes for buildings constructed in the 1990s than before 1951. Here are

Figure II-1 Cumulative Percentages Of GSF Constructed By Decades, By College Types



the comparisons of average GSF per building constructed before 1951 and after 1990, by college types:

	Before 1951	After 1990
Medical Colleges	33,000	131,000
Public/Private HBCUs	14,000	48,000
Private Research Universities	30,000	46,000
Doctoral Universities	21,000	40,000
Two-Year Colleges	7,000	35,000
Public 4-Year/Masters	36,000	30,000
Public Research Universities	25,000	28,000
Private Masters Universities	17,000	26,000
Private 4-Year Colleges	15,000	16,000
All Respondents	22,000	33,000

TABLE II-2 Average Gross Square Footage Per Building By Decades Constructed And College Types *(GSF in thousands)*

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Before 1951	25	30	21	36	17
1951–1960	26	31	29	13	25
1961–1970	33	34	42	42	25
1971–1980	31	26	35	42	17
1981–1990	28	44	22	35	22
1991–1994	28	46	40	30	26
All Years	29	33	30	28	21
Number	42	14	24	68	26

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Before 1951	15	14	7	33	22
1951–1960	22	16	17	58	22
1961–1970	23	26	24	47	32
1971–1980	23	49	29	99	34
1981–1990	19	30	51	70	33
1991–1994	16	48	35	131	33
All Years	19	22	24	66	27
Number	62	8	46	12	302

Even though the responding colleges are not necessarily representative of all colleges and universities, it is very likely that the buildings constructed during the 1990s were much larger in GSF than ones constructed before 1950. This is quite logical, because there are many more students, staff, and faculty to occupy the buildings now than 40 years ago. In 1951, colleges enrolled 2.1 million students. By 1993 the number had risen to 14.3 million. It is also possible the advances in heating, ventilation, and air conditioning made constructing and using larger buildings more feasible.

Campus Sizes and Facility Uses

On the average, the total gross square footage of the respondents' campuses was 1,350,000. But the ranges of GSF per campus were quite large. The average sizes ranged from 480,000 GSF for two-year colleges to 9,750,000 GSF for public research universities. Four college types reported average total gross square footage below 2 million: two-year colleges, 480,000 GSF; private four-year colleges, 820,000 GSF; private masters universities, 990,000 GSF; and public and private historically black colleges and universities (HBCUs), 1,410,000 GSF.

Table II-3 shows the estimated average and aggregate GSF of owned facilities space by college types. **It was estimated that the nation's colleges had about 4 billion GSF of owned facilities in 1993–94.** About 21 percent of the combined total GSF was located at public research universities and another 21 percent was at public four-year/masters colleges. Another 17 percent of the GSF was at two-year colleges, and about 16 percent was at the private four-year/masters colleges.

It was recognized that the survey respondents were not representative of all colleges. Respondents were, in general, larger than all colleges. Therefore, three estimates of the total gross square footage of owned ***and rented*** facilities on all college and university campuses were calculated. The results appear in Table II-4. In the aggregate, there was between 3.5 billion and 4.6 billion GSF owned and rented by American colleges and universities in 1993–94. The mean estimate was about 4.078 billion GSF.

Regardless of whether the low, mean, or high estimates of aggregate GSF are used, the percentages of the total square footage are distributed similarly among the different college types. For example, here is how

TABLE II-3 Estimated Average And Aggregate Gross Square Footage Of Owned Facilities Space, By College Types
(GSF amounts in millions)

	Per Campus Average	Estimated Aggregate	Percent of Total
Public Research Universities	9.75	829	20.7%
Private Research Universities	6.67	260	6.5
Doctoral Universities	3.37	364	9.1
Public 4-Year/Masters	2.16	833	20.8
Private Masters	0.99	249	6.2
Private 4-Year	0.82	413	10.3
Public/Private HBCUs	1.41	138	3.5
2-Year Colleges	0.48	694	17.4
Medical Colleges	3.06	221	5.5
All Colleges	1.35	4,001	100.0%

TABLE II-4 Estimated Aggregate Gross Square Footage Of Owned And Rented Facilities By College Types *(GSF in millions)*

	Low	Mean	High
Public Research Universities	777	841	905
Private Research Universities	216	263	310
Doctoral Universities	329	366	403
Public 4-Year/Masters	719	837	956
Private Masters	208	274	340
Private 4-Year	373	414	455
Public/Private HBCUs	114	138	163
2-Year Colleges	601	717	834
Medical Colleges	187	228	269
All Colleges	3,524	4,078	4,635

the percentage distributions of the total GSF vary under the low and the high estimates:

	Low Estimates	High Estimates
Research Universities	28.1 percent	26.2 percent
Doctoral Universities	9.3 percent	8.7 percent
Public 4-Year/Masters	20.4 percent	20.6 percent
Private 4-Year/Masters	16.5 percent	17.1 percent
Two-Year Colleges	17.1 percent	18.0 percent

The survey asked the colleges to classify their gross square footage by the use of the facilities. For all respondents, about 19 percent of the space was used for residential purposes, 12 percent was used for offices, 10 percent each for classrooms and for laboratories, 8 percent each for general use and special use purposes, and 6 percent each for libraries and support facilities. About 17 percent of the space was classified as non-assignable (see Table II-5).

Space assignments varied somewhat by college types. Private four-year/masters colleges devoted more of their total space than did other colleges to residential facilities, 31 percent versus 15 percent. They devoted less to laboratories, 5 percent versus 11 percent. Two-year colleges devoted more of their total space to classrooms than did other types of colleges, 23 percent versus 8 percent. Only the HBCUs and medical colleges devoted more than 10 percent of their gross square footage to health care facilities.

The study staff weighted the respondents' use assignments to estimate the total space assigned to various uses on all campuses. The results are displayed in Figure II-2. If the percentage distributions are valid, and if

TABLE II-5 Percentage Classification Of Gross Square Footage, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Classrooms	3.6%	4.0%	5.8%	8.7%	12.5%
Residential	15.2	15.4	20.2	19.9	28.1
Offices	13.4	15.0	11.4	9.6	11.9
Laboratories	12.4	11.4	9.7	8.8	4.8
General Use	6.2	6.8	8.6	7.8	7.8
Special Use	7.3	8.5	8.1	8.2	7.9
Libraries	4.5	6.6	5.6	5.2	6.2
Support	7.5	9.3	5.4	8.9	3.3
Health Care	2.5	6.5	0.4	8.5	0.4
Non-Assignable	27.4	16.5	24.8	14.4	17.1
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	40	39	25	65	26

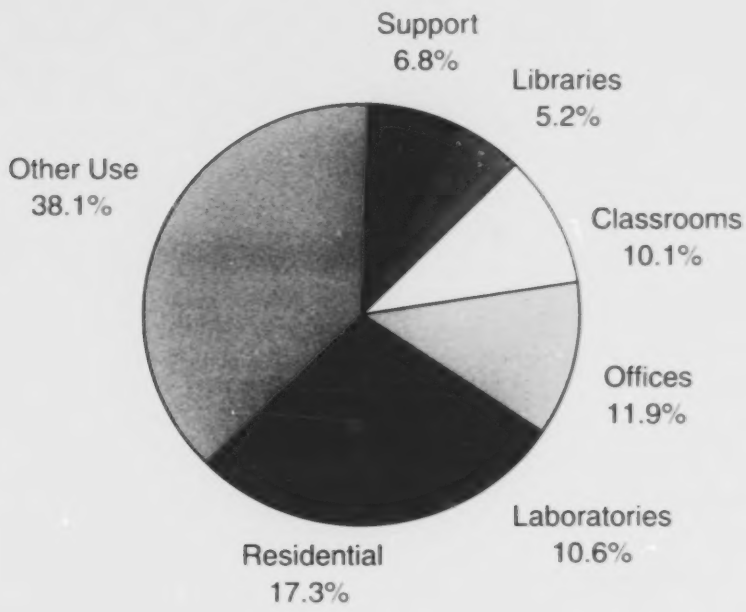
	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Classrooms	12.3%	14.0%	23.5%	2.7%	10.3%
Residential	32.3	26.6	4.2	9.0	19.3
Offices	8.2	11.7	13.2	14.8	11.6
Laboratories	5.6	8.6	16.3	11.0	9.8
General Use	8.9	6.2	9.3	3.4	7.7
Special Use	9.6	7.2	8.3	1.7	8.1
Libraries	6.5	5.5	5.4	2.0	6.1
Support	3.5	2.2	5.4	14.6	5.8
Health Care	0.4	10.1	0.2	10.7	3.8
Non-Assignable	12.7	8.6	14.2	30.1	17.5
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	59	8	44	12	318

the 4 billion GSF estimate of facilities space for all campuses also is valid, then estimates of total GSF devoted to various uses are possible.

Here are the estimates by broad use categories:

Residential	694 million GSF
Offices	476 million GSF
Laboratories	425 million GSF
Classrooms	403 million GSF
Special Use	311 million GSF
General Use	301 million GSF
Support Facilities	274 million GSF
Libraries	207 million GSF
Health Care	155 million GSF
Non-Assignable	755 million GSF

Figure II-2 Total Space Assigned to Uses On All Campuses



Since there are approximately 14 million students enrolled in colleges and universities, it appears that there was about 29 gross square feet of classroom space for every student in 1993–94 (403 million divided by 14 million equals 28.8). Following this logic, there was about 50 GSF of residential space, 30 GSF of laboratory space, and 15 GSF of library space for every student in 1993–94.

Renovations on College Campuses

To determine how up-to-date campus facilities were, the survey asked respondents to indicate how much of their gross square footage had been renovated since 1975, by when they were originally constructed. However, respondents indicated that more space had been renovated than was constructed for a given time period. For example, some reported that 42,000 GSF had been constructed in 1961 to 1970 but 53,000 GSF had been renovated since 1975. So it was impossible to determine exactly when certain GSF were renovated. Therefore, the study staff decided to simply count "renovations since 1975" regardless of when the space was constructed.

Table II-6 shows respondents reported, on the average, that 27 percent of their total GSF had been renovated since 1975. Public research uni-

TABLE II-6 Percentages Of Total Gross Square Footage Renovated Since 1975, By College Types[2]

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Below 10%	38.8%	25.0%	19.0%	28.8%	25.0%
10% to 19%	25.8	25.0	28.6	32.2	12.5
20% to 29%	16.1	16.7	19.0	11.8	29.2
30% to 39%	16.1	16.7	19.0	6.8	12.5
40% to 49%	3.2	0.0	9.6	6.8	4.2
50% to 59%	0.0	8.3	0.0	3.4	8.3
60% Or More	0.0	8.3	4.8	10.2	8.3
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	14.4%	20.0%	21.2%	16.6%	24.3%
Mean	17.2%	24.4%	23.4%	23.7%	26.3%
Number	31	12	21	59	24

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Below 10%	12.5%	28.6%	45.7%	22.2%	27.0%
10% to 19%	28.6	14.3	14.3	33.3	25.1
20% to 29%	16.1	14.3	8.6	0.0	14.9
30% to 39%	12.5	14.3	5.7	22.2	11.8
40% to 49%	7.1	0.0	5.7	0.0	5.5
50% to 59%	7.1	0.0	2.9	11.1	4.3
60% Or More	16.1	28.6	17.1	11.1	11.4
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	25.6%	25.0%	13.0%	18.3%	19.1%
Mean	33.8%	30.8%	28.9%	30.6%	27.5%
Number	56	7	35	9	255

versities reported the smallest average percentage of GSF renovated, 17 percent, and private four-year colleges reported the largest percentage, nearly 34 percent. Two-year colleges were less likely than others to report space renovations. For example, almost 46 percent of two-year colleges said under 10 percent of their total space had been renovated since 1975. This should not be too surprising, because 50 percent of the GSF at two-year colleges was constructed after 1975. So the space might not have needed renovation.

Only 16 percent said that more than half of the gross square footage on their campuses had been renovated since 1975. The two-year colleges and medical colleges were slightly more likely than other colleges to report that half their space had been renovated, 20 percent versus 15 percent.

It was estimated that about 23 percent of the aggregate GSF across *all* college and university campuses had been renovated since 1975. It was further estimated that 32 percent of the aggregate GSF had been constructed since 1975. Therefore, since 1975, about 55 percent of all the GSF on all campuses has been constructed or renovated. Here are the estimated percentages for each college type:

	Percent Renovated	Percent Constructed	Percent Combined
Two-Year Colleges	25.6%	50.1%	75.7%
Medical Colleges	25.8	48.0	73.8
Public/Private HBCUs	28.3	31.1	59.4
Public 4-Year/Masters	22.3	33.6	55.9
Private Masters Universities	24.1	28.5	52.6
Private 4-Year Colleges	32.4	19.8	52.2
Private Research Universities	22.7	27.3	50.0
Doctoral Universities	22.2	23.1	45.3
Public Research Universities	16.3	25.1	41.4
All Colleges	23.2	32.3	55.5

There was no way to tell from the responses whether some GSF had been renovated more than once since 1975, or how much space had been constructed *and then* renovated since 1975. *Therefore, the combined percentages very likely over-estimate the actual GSF of space that has been renovated or constructed since 1975.*

However, if these estimates are valid, then they suggest that, on the average, about half the gross square footage on U.S. colleges and universities has been constructed and/or renovated during the past 20 years. Of course this would mean that about half the space has *not* been constructed or renovated, and that would make it fairly aged.

The most "youthful" facilities are likely to be found on two-year and medical college campuses, where almost three-fourths of the GSF space has been renovated or constructed since 1975. The most "mature" facilities are likely to be found on public research university and doctoral university campuses. Only 41 percent of the GSF at the former and 45 percent of the GSF at the latter has been renovated or constructed since 1975.

Summary and Conclusions

The 1960s saw the construction of 26 percent of the gross square footage of current campus facilities. The 1970s added 18 percent of today's GSF of facilities space. About 20 percent of all the GSF was constructed after 1980, with the most space, over 33 percent, added to two-year

colleges and medical colleges since that year. Under 15 percent of the total GSF at doctoral universities and four-year private colleges was constructed after 1980.

Average building sizes have grown in recent years, averaging 33,000 GSF since 1990. The average GSF for facilities on the respondents' campuses was 1,350,000 in 1993–94. But the average sizes varied dramatically, from 480,000 GSF at the two-year colleges to almost 10 million GSF at public research universities. Based on the survey responses, it was estimated that the nation's colleges owned over 4 billion GSF of facilities space in 1993–94. About 42 percent of the total GSF was on campuses of public four-year colleges, masters universities, and research universities. Another 17 percent was at two-year colleges and 16 percent was at private four-year/masters colleges.

It was estimated that 17 percent, or 694 million, of the 4 billion GSF on all college campuses was assigned to residential space. The next largest uses of space were the 476 million GSF used for offices, the 425 million used for laboratories, and the 403 million used for classrooms. Since there were approximately 14 million students at colleges and universities, it was estimated that there was, on the average, about 29 GSF of classroom space, 50 GSF of residential space, 30 GSF of laboratory space, and 15 GSF of library space for every student in 1993–94.

Survey responses indicated that about 23 percent of all the GSF on the nation's college campuses has been renovated since 1975. About 55 percent of all the GSF on all college campuses has been constructed and/or renovated since that year. This means that about half the current GSF has not be renewed in the past 20 years.

College campuses have grown substantially in value, size, and number in the past five decades. However, the survey responses suggest that a substantial percentage of the space on campuses is aged, and this aged physical plant helps explain why there is so much accumulated deferred maintenance on college campuses.

Notes

1. This estimate was based on U.S. Department of Education, National Center For Education Statistics financial survey data, as reported in the 1995 issue of the *NCES Digest of Education Statistics*, Washington: USGPO, 1995, Table 345.
2. Total GSF does not include facilities constructed between 1991 and 1994.

Part III

Construction and Renovation on College and University Campuses

The survey asked colleges whether they had construction or renovation projects in progress or planned for the near future, what types of facilities were or would be involved, how much space was being constructed or renovated, how much they would spend for these activities, and the sources of funds. The colleges were also asked to identify their top priority construction and renovation projects, by facilities types. This chapter describes the responses to these questions.

Current Construction and Renovation Projects

Almost 46 percent of respondents reported construction projects in progress, almost 49 percent were working on renovation projects, and 31 percent were doing both. The percentages with construction projects in progress varied by college types. Table III-1 shows that more than six out of ten research universities and medical colleges and five out of ten doctoral universities and public four-year/masters colleges were constructing facilities. But only four out of ten two-year colleges and three out of ten private four-year/masters colleges and historically black colleges and universities (HBCUs) reported construction projects.

The research universities, doctoral universities, public four-year/masters colleges, HBCUs, two-year colleges, and medical colleges were about as likely to have renovation projects as they were to have construction projects in progress. But private four-year/masters colleges were slightly more likely to have renovation than construction projects in progress, 49 percent versus 31 percent.

Only 31 percent of colleges reported *both* kinds of activities. The research universities were much more likely than all other college types to report both construction and renovation activities, 61 percent versus only 25 percent. Both kinds of projects were reported by about 36 percent of doctoral universities, public four-year/masters colleges, and medical colleges, but by just 17 percent of the private four-year/masters colleges, two-year colleges, and HBCUs.

TABLE III-1 Percentages Of Respondents Reporting Construction and Renovation Projects In Progress, By College Types

	Construction	Renovation	Both	Number
Public Research Universities	68.0%	66.0%	58.0%	50
Private Research Universities	66.7	71.4	66.7	21
Doctoral Universities	47.4	50.0	36.8	38
Public 4-Year/Masters	54.0	55.4	32.4	74
Private Masters	30.3	57.6	24.2	33
Private 4-Year	31.5	45.2	17.8	73
Public/Private HBCUs	30.6	22.2	13.9	36
2-Year Colleges	38.6	29.8	17.5	57
Medical Colleges	61.1	55.6	50.0	18
All Respondents	45.7	48.7	31.5	400
All Colleges*	40.0%	39.3%	23.1%	

*Weighted by proportions in the population.

The study staff wondered if colleges reporting construction and renovation projects differed in sizes of physical plants and annual budgets from colleges that did not report any. Table III-2 displays the average current replacement value of buildings for colleges reporting no construction or renovation projects in progress, those reporting both, and those reporting one or the other kind of activity. The public research universities with building activities reported *lower* mean building replacement values than did their peers with no work in progress. Just the opposite was true for the private research universities, with the 17 institutions reporting projects in progress having *higher* mean building replacement values than the two institutions with no projects.

There was no apparent relationship between their building replacement values and the extent to which the doctoral universities, public four-year/masters colleges, and private masters universities were involved in construction or renovation projects. Private four-year colleges with renovation projects in progress reported 19 percent higher average building replacement values than those of their peers. Medical colleges with building projects also had higher average replacement values than those without them, $267 million versus $122 million. The average building replacement values for two-year colleges with renovation projects and both kinds of projects were larger than the average for those doing only construction or nothing at all, $42 million versus $32 million. HBCUs with building projects had *lower* average replacement values than those without projects, $88 million versus $122 million.

Next the study staff looked at the relationships between building projects and the responding colleges' annual average total education and general (E&G) expenditures. The data are displayed in Table III-3. Public research universities with building projects had 11 percent *lower* average E&G expenditures than did those without projects, $431 million as compared to $487 million. The E&G expenditures for the three private research universities with no building projects were about half the amounts of those with projects. The average E&G expenditures for the four categories of doctoral universities and public four-year/masters colleges were not significantly different.

Private masters universities reporting construction projects and both construction and renovation projects in progress had higher average E&G expenditures than their peers reporting just renovations or no building work at all, $49 million versus $37 million. But the numbers for these types of universities were quite small, so little should be made of the differences. Just as the four-year private colleges with only renovation projects had larger average building replacement values than their peers, so they had greater average E&G expenditures.

TABLE III-2 Average Current Replacement Value Of Buildings For Colleges Reporting Both Construction And Renovation, Some Construction, Some Renovation, And None, By College Types
(dollar amounts in millions)

	Both	Construction	Renovation	None
Public Research Universities	$ 878.6	$875.4	$904.1	$1,007.7
(N)	(28)	(32)	(31)	(12)
Private Research Universities	$1,022.2	$991.4	$990.6	$ 492.4
(N)	(16)	(17)	(17)	(2)
Doctoral Universities	$ 283.6	$293.4	$279.7	$ 285.7
(N)	(22)	(25)	(26)	(8)
Public 4-Year/Masters	$ 189.6	$199.0	$174.2	$ 171.8
(N)	(25)	(36)	(36)	(31)
Private Masters	$ 89.1	$ 90.7	$ 82.9	$ 94.2
(N)	(9)	(11)	(22)	(21)
Private 4-Year	$ 63.3	$ 63.8	$ 75.4	$ 63.7
(N)	(17)	(26)	(32)	(41)
Public/Private HBCUs	$ 94.0	$ 87.5	$ 82.7	$ 122.2
(N)	(12)	(18)	(18)	(13)
2-Year Colleges	$ 44.5	$ 33.4	$ 39.1	$ 30.0
(N)	(14)	(26)	(24)	(37)
Medical Colleges	$ 276.2	$249.9	$276.2	$ 122.1
(N)	(8)	(10)	(8)	(4)
All Respondents	$ 382.6	$333.1	$314.4	$ 168.4
(N)	(151)	(201)	(214)	(169)

TABLE III-3 Average Total Education And General Expenditures For Colleges Reporting Both Construction And Renovation, Some Construction, Some Renovation, And None, By College Types
(dollar amounts in millions)

	Both	Construction	Renovation	None
Public Research Universities	$429.4	$435.0	$429.7	$486.4
(N)	(36)	(41)	(39)	(14)
Private Research Universities	$408.7	$400.2	$388.3	$218.6
(N)	(18)	(19)	(20)	(3)
Doctoral Universities	$116.1	$118.4	$116.8	$119.1
(N)	(26)	(31)	(31)	(12)
Public 4-Year/Masters	$ 55.8	$ 65.7	$ 53.5	$ 59.5
(N)	(28)	(44)	(44)	(45)
Private Masters	$ 49.6	$ 47.5	$ 38.9	$ 34.8
(N)	(10)	(23)	(12)	(23)
Private 4-Year	$ 24.0	$ 23.2	$ 28.2	$ 22.5
(N)	(22)	(34)	(41)	(51)
Public/Private HBCUs	$ 30.6	$ 32.5	$ 32.1	$ 49.9
(N)	(19)	(27)	(26)	(17)
2-Year Colleges	$ 32.1	$ 22.6	$ 26.6	$ 17.0
(N)	(16)	(28)	(26)	(39)
Medical Colleges	$157.7	$153.0	$157.7	$138.3
(N)	(13)	(16)	(13)	(5)
All Respondents	$167.9	$148.5	$137.0	$ 75.2
(N)	(188)	(251)	(264)	(209)

The HBCUs with projects had smaller average building replacement values and E&G expenditures than those of peers not building anything. Size (as measured by building replacement values and average E&G expenditures) also seemed related to building activities among medical colleges, because those with projects in progress had larger average E&G expenditures as well as greater building replacement values. The two-year colleges with building projects in progress also had larger average E&G expenditures than their peer colleges.

When the results of the two comparisons of size and building activities are combined, a few relationships appear. Among private research universities, medical colleges, and two-year colleges, it appears that the larger the institutions, the more likely they were to have some kind of building project in progress. Just the opposite relationship is apparent for public research universities and HBCUs, with the *larger* ones *less* likely to have reported projects. Size appears to have no consistent relationship to building activities for doctoral universities, public four-year/masters colleges, and private masters universities. Size might have some slight relationship to building activities among private four-year colleges, with

the larger ones more likely to be involved in renovation projects than in other kinds of activities.

Types of Facilities Being Constructed

The colleges were asked what types of facilities they were building. Over 25 percent were constructing laboratories or classrooms; between 20 and 23 percent were constructing special use, support, or office facilities; between 17 percent and 19 percent were constructing library, general use, residential, or infrastructure facilities; and just under 13 percent were constructing health care facilities. (About 11 percent said they were involved with "non-assignable" construction projects.) Table III-4 displays the data.

The types of facilities under construction varied by college types. The three facilities categories colleges were most likely to be constructing were examined. Ten of the eleven facilities categories were identified by at least one college type. Classrooms made the "top three" for six of the nine college types: the public research universities, doctoral universities, public four-year and masters colleges, private four-year colleges, HBCUs, and two-year colleges.

Construction of support facilities was emphasized at four college types; the public research universities, doctoral universities, public four-year and master colleges, and medical colleges. Construction of special use facilities was emphasized at doctoral universities, private masters universities, HBCUs, and medical colleges. Laboratories were leading construction projects at three college types; public research universities, private research universities, and medical colleges. Building residential facilities was emphasized at private four-year colleges; private masters universities, and the HBCUs.

Private research and masters universities emphasized general use facility construction; private research universities and two-year colleges emphasized libraries; and four-year public/masters colleges and two-year colleges emphasized office facilities. Health care facilities made the "top three" of just the medical colleges; infrastructures were significant to just the four-year private colleges.

Types of Facilities Being Renovated

At least one-fifth of the responding colleges reported *construction* activities for *six* different types of facilities. But only *four* different types of facilities were being *renovated* by as many colleges. The leading facilities renovations categories were: classrooms, 33 percent; offices, 29 percent;

TABLE III-4 Percentages Of Colleges Reporting Construction Of Facilities Types, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Laboratories	58.0%	52.4%	18.4%	18.9%	9.1%
Classrooms	48.0	23.8	26.3	29.7	12.1
Special Use	42.0	28.6	31.6	21.6	15.1
Support	44.0	23.8	28.9	25.7	12.1
Offices	36.0	19.1	13.2	23.0	9.1
Infrastructure	42.0	28.6	10.5	13.5	6.1
Health Care	26.0	28.6	5.3	8.1	3.0
Libraries	46.0	38.1	18.4	16.2	3.0
General Use	30.0	38.1	15.8	21.6	15.2
Residential	30.0	28.6	10.5	10.8	15.2
Non-Assignable	20.0	9.5	7.9	10.8	6.1
All Types	68.0%	66.7%	47.4%	54.0%	30.3%
Number	50	21	38	74	33

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Laboratories	15.1%	16.7%	19.3%	50.0%	25.5%
Classrooms	21.9	25.0	29.8	16.7	27.5
Special Use	15.1	22.2	15.8	27.8	23.3
Support	12.3	11.1	14.0	27.8	21.8
Offices	13.7	8.3	22.8	38.9	20.0
Infrastructure	16.4	8.3	10.5	27.8	17.3
Health Care	11.0	2.8	8.8	50.0	12.7
Libraries	15.1	5.6	17.5	11.1	19.0
General Use	13.7	13.9	12.3	22.2	19.0
Residential	21.9	25.0	8.8	5.6	17.2
Non-Assignable	11.0	5.6	12.3	11.1	11.0
All Types	31.5%	19.4%	38.6%	55.6%	44.5%
Number	73	36	57	18	400

laboratories, 26 percent; and residential facilities, about 24 percent. About 18 percent each reported renovating their special use and general use facilities, and their infrastructures. About 15 percent were renovating libraries and support facilities; 13 percent, health care facilities; and 11 percent, some "non-assignable" space. Table III-5 displays the data.

Although *ten* of the eleven facilities categories made some college type's "top three" in frequency of construction projects, only *seven* categories made the colleges' "top three" in frequency of renovation projects. Reno-

vation of classrooms ranked first or second for all nine college types. Offices were among the three most frequently renovated facilities types at all but private four-year colleges medical colleges. Laboratories made the "top three" for all but the doctoral universities, HBCUs, and two-year colleges. Renovating residential facilities was emphasized at doctoral universities, private four-year colleges and masters universities, and the HBCUs. Renovating libraries was a leading priority only for two-year colleges; health care facilities and infrastructure were leading priorities only for medical colleges. The colleges were more likely to have been constructing than renovating special use and support facilities. But they were more likely to have been renovating than building office and residential facilities.

TABLE III-5 Percentages Of Colleges Reporting Renovation Of Facilities Types, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Laboratories	50.0%	61.9%	26.3%	20.3%	21.2%
Classrooms	56.0	52.4	42.1	24.3	27.3
Special Use	34.0	47.6	13.2	18.9	6.1
Support	24.0	28.6	15.8	14.9	9.1
Offices	52.0	57.1	28.9	25.7	24.2
Infrastructure	32.0	28.6	23.7	16.2	18.2
Health Care	30.0	28.6	7.9	4.0	3.0
Libraries	26.0	28.6	21.0	13.5	6.1
General Use	34.0	38.1	13.2	18.9	12.1
Residential	30.0	42.9	34.2	10.8	21.2
Non-Assignable	20.0	9.5	13.2	9.5	6.1
All Types	66.0%	66.7%	50.0%	55.4%	54.5%
Number	50	21	38	74	33

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Laboratories	23.3%	8.3%	14.0%	33.3%	26.0%
Classrooms	23.3	38.9	26.3	27.8	33.3
Special Use	15.1	19.4	12.3	11.1	18.8
Support	12.3	8.3	14.0	5.6	14.8
Offices	20.6	36.1	17.5	22.2	29.5
Infrastructure	17.8	2.8	10.5	27.8	18.5
Health Care	8.2	5.6	10.5	50.0	12.8
Libraries	12.3	11.1	17.5	5.6	15.8
General Use	16.4	13.9	12.3	11.1	18.5
Residential	32.9	25.0	12.3	16.7	23.8
Non-Assignable	8.2	8.3	14.0	11.1	11.2
All Types	43.8%	13.9%	29.8%	44.4%	46.7%
Number	73	36	57	18	400

Current Construction and Renovation Gross Square Footage

The survey asked colleges how much gross square footage (GSF) was involved in their current building projects. Although the colleges were asked to report their projects' GSF by types of facilities, the responses were insufficient in number for any meaningful statistical analyses. Therefore, the study staff decided to report the GSF amounts for all projects combined for each college type.

The responding colleges' ***average construction*** projects totaled 174,000 GSF; the ***average renovation*** projects totaled 136,000 GSF. Table III-6 displays this data. The mean, standard deviation, minimum, maximum, and standard error values for GSF are given for each college type. Because the numbers of respondents were under 30 for all but the public research universities and the public four-year/masters colleges, and because the ranges for minimum and maximum values for all institutional types were quite broad, it is difficult to make many conclusions about the ***populations*** of colleges from which these samples were drawn.

To help readers see the influence of these factors on the mean GSF under construction, the table presents a column that includes the mean based on excluding the two extremes in the sample distributions. For example, the mean for all responding colleges with construction projects was 174,000 GSF. But the "mean without the extremes" was much smaller, at 137,000 GSF. Based on the standard error of the mean, the population mean of construction projects should fall between 142,000 and 206,000 GSF, or plus or minus 18 percent of the sample mean. Readers should be able to see that statements about the sizes of construction and renovation projects at all colleges and universities are difficult to derive from the survey responses of just some of them.

Dividing the standard errors of the means by their respective means for GSF provides another way of assessing the utility of the survey responses.

Here are the data:

	Construction	Renovation
Doctoral Universities	49%	47%
Private Research Universities	36%	34%
Two-Year Colleges	35%	38%
Medical Colleges	31%	44%
Private Masters Universities	30%	40%
Historically Black Colleges	26%	83%
Public Four-year/Masters	17%	29%
Private Four-year Colleges	16%	37%
Public Research Universities	13%	16%

For example, these data show that the population mean for construction at all doctoral universities could be as much as 49 percent larger or smaller than the 182,000 GSF reported in Table III-6. Put another way, if one were to use the sample mean and its standard error to estimate the total GSF under construction at all research universities in America, the estimate would range from 4.74 million *to almost three times as much*, 13.83 million GSF.

The data suggest that four college types were, on average, *constructing* more gross square footage than they were *renovating*. They include the public and private research universities, the medical colleges, and the public four-year/masters colleges. Doctoral universities, private four-year colleges, and two-year colleges were likely *renovating* more space than they were *constructing*. The data did not lead to any conclusions

TABLE III-6 Amounts Of Gross Square Footage Under Construction And Renovation, By College Types *(GSF amounts in thousands)*

	Construction						
	Mean	S.D.	Minimum	Maximum	N	Mean w/o Extremes	S.E.
Public Research	327	235	57	946	32	315	42
Private Research	254	321	29	1,220	12	180	92
Doctoral Universities	182	372	3	1,566	17	102	90
Public 4-Year/MA	105	115	1	489	37	95	18
Private Masters	67	66	2	175	10	62	20
Private 4-Year	32	21	1	61	20	33	5
Public/Private HBCUs	93	58	37	197	6	81	24
2-Year Colleges	46	72	2	325	19	32	16
Medical Colleges	280	275	10	780	10	251	87
All Respondents	174	169	1	1,566	163	137	32

	Renovation						
	Mean	S.D.	Minimum	Maximum	N	Mean w/o Extremes	S.E.
Public Research	251	223	5	1,142	28	226	41
Private Research	119	136	29	513	11	85	41
Doctoral Universities	196	390	1	1,713	18	113	92
Public 4-Year/MA	91	158	1	858	37	71	26
Private Masters	55	93	1	345	17	39	22
Private 4-Year	79	146	1	723	26	56	29
Public/Private HBCUs	312	573	19	1,336	5	68	256
2-Year Colleges	78	124	1	375	17	62	30
Medical Colleges	211	261	15	776	8	150	93
All Respondents	136	198	1	1,713	167	100	47

about whether the private masters universities and the HBCUs were building or renovating more space.

The Costs of Current Construction and Renovation

The colleges reported spending on the average $25.4 million for construction and $12.6 million for renovation projects. That works out to about $146 per GSF of construction and $93 per GSF of renovation. However, just as the means for GSF must be interpreted with caution, so should the data for dollars spent.

The standard error of the mean for the average construction expenditure of $25.4 million was $5.9 million, or 23 percent of the mean value. The standard error for the average renovation value was $3.9 million, or 31 percent of the mean, $12.6 million. So it would be difficult to reach firm conclusions about the mean expenditure patterns for all colleges from these sample responses. Table III-7 displays the expenditures for construction and renovation.

The rank orders of mean construction expenditures by types of colleges were similar to the rank orders of mean GSF under construction. Generally, the greater the average total GSF under construction, the greater the average total construction expenditure. There is, however, an exception to this pattern. The private masters universities ranked seventh on average total GSF under construction but ranked fourth on average construction expenditures.

Table III-8 displays the mean construction and renovation expenditures per gross square foot at each college type. Construction expenditures were 57 percent higher than renovation expenditures, $146 versus $93 per GSF. The research universities and medical colleges spent more construction dollars per GSF than the other colleges, possibly because they were more likely to have been building laboratories. The other college types were more likely to have been building classrooms, residences, and special use or support facilities.

Average renovation expenditures per GSF also were higher at the research universities and medical colleges than at other college types. Again these college types were more likely than others to have been working on laboratories and health care facilities, possibly driving their costs upward. Colleges with lower mean renovation expenditures per GSF were more likely to have targeted work on classrooms, offices, and residential facilities.

TABLE III-7 Dollars Spent On Construction And Renovation, By College Types *(dollar amounts in millions)*

Construction

	Mean	S.D.	Minimum	Maximum	N	Mean w/o Extremes	S.E.
Public Research	$70.76	102.90	$4.36	$524.00	34	$58.67	17.65
Private Research	42.90	31.49	6.00	100.00	15	41.30	6.13
Doctoral Universities	10.68	11.00	0.11	30.90	18	10.08	2.59
Public 4-Year/MA	10.46	14.87	0.02	66.70	40	9.25	2.35
Private Masters	10.67	12.07	0.02	30.70	10	9.50	3.82
Private 4-Year	4.25	3.26	0.02	12.75	23	4.05	0.57
Public/Private HBCUs	6.29	4.77	1.90	18.00	11	5.48	1.44
2-Year Colleges	5.14	8.50	0.06	40.00	21	3.68	1.86
Medical Colleges	55.30	58.90	1.20	179.00	11	46.36	17.80
All Respondents	$25.41	29.32	$0.02	$524.00	183	$21.87	5.86

Renovation

	Mean	S.D.	Minimum	Maximum	N	Mean w/o Extremes	S.E.
Public Research	$37.08	57.72	$0.10	$249.40	33	$31.43	10.05
Private Research	35.13	55.93	0.03	213.05	15	24.15	14.44
Doctoral Universities	5.26	4.75	0.17	20.34	18	4.63	1.12
Public 4-Year/MA	5.03	11.22	0.60	70.10	40	3.45	1.77
Private Masters	2.50	6.58	0.01	29.00	19	1.09	1.51
Private 4-Year	2.33	3.26	0.06	13.00	33	2.06	0.57
Public/Private HBCUs	6.39	3.04	1.60	10.48	8	6.51	1.08
2-Year Colleges	3.40	5.51	0.05	18.20	17	2.64	1.34
Medical Colleges	14.86	12.87	2.75	40.30	10	13.19	4.07
All Respondents	$12.58	18.69	$0.01	$249.40	193	$10.04	3.93

Although the survey data on construction and renovation activities is biased, it may be helpful to readers to have global estimates of the aggregate amounts *all colleges* spent and the amounts of gross square footage involved. So the study staff has constructed such estimates using the means and standard errors of means data and weighting those statistics by the numbers of colleges within each college type. Here are the estimates of *millions* of gross square footage being constructed and renovated on all college campuses:

	Low	Middle	High
Construction	77	107	137
Renovation	53	92	131

TABLE III-8 Mean Construction And Renovation Expenditures Per Gross Square Foot, By College Types

Construction

	Per GSF Mean	Leading Types of Construction
Public Research	$216	Labs, Classrooms
Medical Colleges	198	Labs, Health Care
Private Research	169	Labs, Classrooms
Private Masters	160	Special Use, General Use
Private 4-Year	133	Classrooms, Residential
2-Year Colleges	112	Classrooms, Offices
Public 4-Year/Masters	100	Classrooms, Support
Public/Private HBCUs	68	Classrooms, Special Use
Doctoral Universities	59	Special Use, Support
All Respondents	$146	

Renovation

	Per GSF Mean	Leading Types of Construction
Private Research	$295	Labs, Offices
Public Research	148	Labs, Classrooms
Medical Colleges	70	Health Care, Labs
Public 4-Year/Masters	55	Offices, Classrooms
2-Year Colleges	44	Classrooms
Private Masters	32	Classrooms, Offices
Private 4-Year	29	Residential
Doctoral Universities	27	Classrooms, Residential
Public/Private HBCUs	10	Classrooms, Offices
All Respondents	$ 93	

The estimates of space under construction range from 77 million to 137 million GSF. Based on the Chapter II estimates of aggregate GSF owned and rented by colleges, it appears that colleges were expanding their total GSF space by somewhere between 1.7 percent and 3.9 percent *with the study staff best estimate at 2.5 percent.*

The total space being renovated was estimated at between 53 million and 131 million GSF. Thus, again using the Chapter II estimates, it appears that colleges were renovating between 1.2 percent and 3.7 percent of their aggregate space *with the study staff best estimate at 2.3 percent.*

These percentage estimates may seem small to some readers. However, it should be recalled that not all colleges reported construction or renovation projects in progress. As Table III-1 showed, only 46 percent had active construction projects and just 49 percent were doing renovations.

What might all colleges have been spending on construction and renovation? Using the same methods of estimating the GSF data, the estimates of *billions of dollars* for construction and renovation expenditures are as follows:

	Low	Middle	High
Construction	$10.8	$14.8	$18.9
Renovation	$ 5.7	$ 8.7	$11.6

The estimated total construction expenditures range from $10.8 billion to $19 billion, a 75 percent difference. The highest estimated total renovation expenditure is twice as much as the lowest, $11.6 billion versus $5.7 billion. The width of these ranges demonstrates why the study staff was reluctant to draw conclusions about all colleges from the survey data. The colleges that responded to the survey generally were larger than those that did not. Therefore, it is likely that the actual construction expenditures of *all colleges* are somewhere between $10.8 billion and $14.8 billion. *The staff best estimate is about $12 billion. The staff best estimate for actual renovation expenditures is about $7 billion.*[1]

Future Construction and Renovation on College Campuses

More colleges reported plans for future construction and renovation projects than reported current building activities. While 46 percent reported current construction projects, over 54 percent reported ones they would start in 1995–96 or 1996–97. About 49 percent reported current, but 56 percent reported future, renovation projects. About 31 percent reported both current construction and renovation projects and over 36 percent planned both. Statistically, significantly more colleges reported future than current *construction* projects, so an increase in *construction* projects should be expected in the near future. However, the percentage of colleges reporting future *renovation* and both types of building activities was not statistically significantly greater than the percentage with current projects. Therefore, a substantial increase in the proportions of colleges with *renovation* projects should not be expected.

Private four-year colleges were significantly more likely to have been planning future construction projects than to have been engaged in them,

52 percent versus 31 percent. Doctoral universities also were more likely to have been planning future construction projects, 68 percent versus 47 percent, but that latter difference was not statistically significant. The percentage of private research universities planning future construction projects was less than the percentage working on current ones, but this difference also was not statistically significant. Table III-9 shows that the percentage of colleges planning future construction and renovation activities varies by college types, with the larger institutions generally more likely than smaller ones to have planned on future building projects.

TABLE III-9 Percentages of Respondents Reporting Future Construction and Renovation Projects, Planned For 1995 and 1996, By College Types

	Construction	Renovation	Both	Number
Public Research	72.1%	67.4%	60.5%	43
Private Research	53.3	80.0	53.3	15
Doctoral Universities	68.0	68.0	52.0	25
Public 4-Year/Masters	50.0	50.0	32.4	68
Private Masters	51.9	55.6	40.7	27
Private 4-Year	52.3	49.2	24.6	65
Public/Private HBCUs	62.5	62.5	50.0	8
2-Year Colleges	40.4	42.6	14.9	47
Medical Colleges	58.3	66.7	50.0	12
All Respondents	54.5%	55.8%	36.5%	310
All Colleges	47.9%	49.1%	26.2%	

*Weighted by proportions in the population

Future Construction and Renovation Space and Expenditures

The number of responses to questions concerning *future* construction and renovation made it difficult to generalize to the population of colleges. The data suggest that future construction projects will, on the average, be larger than current ones. The per campus average for future *construction* projects was 197,000 GSF, versus 174,000 GSF for current projects. The means for future and current *renovation* projects were identical, at 136,000 GSF. When statistical tests were applied to the differences in means for each type of college, for construction and renovation projects, none was statistically significantly different. Therefore, it is difficult to say whether future projects will be larger than current ones. Table III-10 displays the GSF for future projects, by college types.

TABLE III-10 Amounts Of Gross Square Footage Planned For Construction And Renovation In The Near Future, By College Types
(GSF amounts in thousands)

Construction

	Mean	S.D.	Minimum	Maximum	N	Mean w/o Extremes	S.E.
Public Research	294	188	5	693	30	290	34
Private Research	142	144	10	388	6	112	59
Doctoral Universities	126	100	14	391	16	115	25
Public 4-Year/MA	129	146	1	547	34	120	25
Private Masters	781	2,689	2	10,120	14	68	719
Private 4-Year	45	42	3	185	34	42	7
Public/Private HBCUs	192	149	66	436	5	152	67
2-Year Colleges	53	44	60	181	18	45	10
Medical Colleges	228	204	10	591	7	199	78
All Respondents	197	336	1	10,120	164	126	85

Renovation

	Mean	S.D.	Minimum	Maximum	N	Mean w/o Extremes	S.E.
Public Research	246	264	45	1,307	30	197	50
Private Research	140	163	32	529	9	99	54
Doctoral Universities	156	114	6	357	16	152	28
Public 4-Year/MA	115	134	3	591	33	103	23
Private Masters	113	204	3	800	15	68	53
Private 4-Year	99	140	1	563	29	86	26
Public/Private HBCUs	283	403	4	944	5	155	180
2-Year Colleges	28	32	1	120	19	24	7
Medical Colleges	92	83	5	248	7	78	31
All Respondents	136	159	1	1,307	163	93	37

On average, the colleges reported spending $25.4 million on current construction and $12.58 million on current renovation projects. The respective amounts they expected to spend for future projects were $21.5 million and $10.8 million.

Two differences in the mean expenditure amounts by college types were statistically significantly different, at the 0.10 level of significance. Private research universities expected to spend an average of $22 million on future construction projects after spending almost $43 million on current ones. Doctoral universities expected to spend $9.6 billion on future renovation projects after spending only $5.3 on their current ones. The other differences between mean current and future expenditures

were not statistically significant at the 0.10 level. So it is impossible to identify a downward or upward trend. Table III-11 displays the mean amounts the colleges expected to spend on future projects.

The study staff estimated the total GSF for *future* construction and renovation projects by using the strategy employed earlier in this chapter for current projects. Here are the estimates of *millions* of gross square footage to be constructed and renovated on *all* college campuses soon:

	Low	Middle	High
Construction	100	127	152
Renovation	91	128	165

TABLE III-11 Dollars To Be Spent On Construction And Renovation Planned For The Near Future, By College Types

(dollar amounts in millions)

Construction

	Mean	S.D.	Minimum	Maximum	N	Mean w/o Extremes	S.E.
Public Research	$61.79	56.58	$1.0	$231.00	31	$58.05	10.16
Private Research	22.02	24.17	0.4	71.90	8	17.31	8.52
Doctoral Universities	15.47	10.44	0.5	33.78	17	15.25	2.51
Public 4-Year/MA	14.08	14.18	1.0	61.04	34	13.02	2.43
Private Masters	10.05	11.26	0.6	39.00	13	8.33	3.12
Private 4-Year	5.95	7.02	0.1	26.00	33	5.49	1.22
Public/Private HBCUs	14.99	4.49	11.2	21.06	4	13.84	2.24
2-Year Colleges	6.00	5.06	0.2	17.31	19	5.67	1.16
Medical Colleges	32.58	23.40	1.0	64.59	7	32.50	8.85
All Respondents	$21.46	19.65	$0.1	$ 71.90	166	$20.00	4.11

Renovation

	Mean	S.D.	Minimum	Maximum	N	Mean w/o Extremes	S.E.
Public Research	$24.12	27.36	$3.8	$129.10	29	$20.99	5.08
Private Research	27.99	36.98	0.7	116.05	12	21.91	10.68
Doctoral Universities	9.58	9.76	0.4	40.20	17	8.15	2.37
Public 4-Year/MA	6.47	14.18	0.3	32.31	34	5.86	1.27
Private Masters	3.33	4.51	0.1	15.00	15	2.68	1.16
Private 4-Year	3.74	5.94	0.1	21.75	32	3.26	1.05
Public/Private HBCUs	22.08	30.54	0.1	75.00	5	11.81	13.66
2-Year Colleges	1.19	1.36	0.1	4.43	20	1.14	0.30
Medical Colleges	16.98	23.77	0.6	71.40	8	10.63	8.40
All Respondents	$10.80	14.61	$0.1	$116.05	172	$ 8.84	3.21

The estimates range from 100 million to 152 million GSF. The estimates for total space to be renovated range from 91 million to 165 million GSF. *The staff best estimate for future construction of space is 107 million GSF; and for future renovation of space, 98 million GSF.*

What might all colleges expect to spend on the construction and renovation projects they planned to begin in 1995–96 and 1996–97? Using the same methods employed above, the estimates of future construction and renovation expenditures in billions, on all college campuses are as follows:

	Low	Middle	High
Construction	$13.3	$16.6	$20.9
Renovation	$ 4.3	$ 6.2	$ 8.0

The estimated total future construction expenditures range from $13.3 billion to nearly $21 billion, a difference of 50 percent. The highest estimated renovation expenditure is 86 percent more than the lowest, $8.0 billion versus $4.3 billion. The width of these ranges again demonstrates why the study staff was reluctant to draw conclusions about all colleges from the survey responses on expenditures and planned building expenditures. Because colleges that responded to the survey generally were larger, the actual future construction expenditures of *all colleges* probably will fall somewhere between $13.3 billion and $16.6 billion. *The staff best estimate is about $14 billion. The staff best estimate for "future" renovation expenditures is about $5 billion.*

Paying for Construction and Renovation Costs

The colleges were asked to identify, by percentage amounts, the sources of funds used for construction and renovation activities. Fewer than half the responding colleges provided this information. Table III-12 shows the distribution of funds by source for research universities, doctoral universities, public and then private four-year/masters colleges, and two-year colleges. It is noteworthy that state funds were the primary source of building dollars for all but the private four-year/masters colleges. It is also noteworthy the research universities reported a greater diversity of funding sources than did other colleges. They got 63 percent of all their funds from just three sources while the other colleges received at least 75 percent from their three leading funding sources. Here are the proportions of funds each college type received from its top three sources:

Public 4-Year/Masters Colleges	86%
Doctoral Universities	80%
Two-Year Colleges	78%
Private 4-Year/Masters Colleges	75%
Public/Private Research Universities	63%

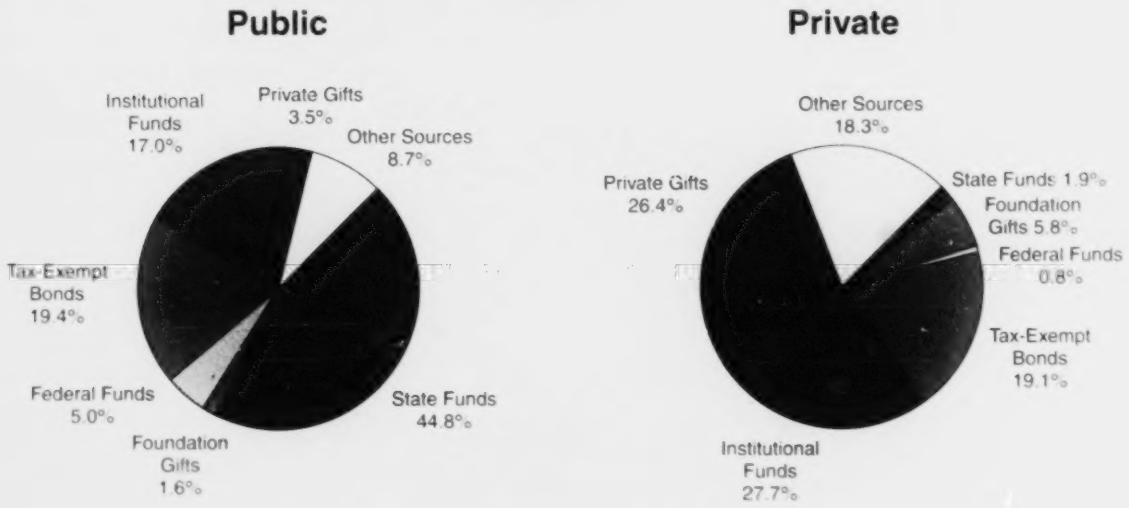
TABLE III-12 Percentage Of Funds Used For Construction And Renovation by Source, By College Types

	Pub/Priv Research	Doctoral Universities	Public 4-YR/MA	Private 4-YR/MA	2-Year Colleges
State Funds	34.3%	43.9%	44.6%	1.6%	36.3%
Tax-Exempt Bonds	16.2	24.5	20.6	20.3	22.0
Institutional Funds	11.8	11.4	21.1	29.7	20.1
Private Gifts	12.5	8.5	1.6	25.7	1.4
Federal Funds	6.5	3.8	3.1	0.8	0.0
Foundation Gifts	4.4	1.2	0.4	5.7	2.3
Internal Loans	3.2	1.0	2.0	3.2	1.6
Commercial Loans	1.1	0.0	0.9	4.7	0.0
Taxable Bonds	3.4	0.0	1.9	0.8	0.7
Other Sources	6.6	5.7	3.8	7.5	15.6
Number	44	18	44	62	20

The less likely that funds are concentrated from just a few sources, the greater the probability that colleges' building projects will go on as scheduled. Similar proportions of construction and renovation funds came from tax-exempt bonds, institutional funds, and private gifts at the private four-year/masters colleges and universities.

The funding sources varied by whether colleges were public or private. Figure III-1 displays the estimated sources of funds for all public and all

Figure III-1 Sources of Funds for Construction and Renovation At Public and Private Four-Year Colleges



private four-year colleges and universities. Although 19 percent of the funds at both types of colleges came from tax-exempt bonds, the percentages from other sources differed considerably between the two college types. For example, state funds accounted for 45 percent of the dollars at the public colleges, but in only 2 percent at the private ones. Private and foundation gifts accounted for 32 percent of the private colleges' building funds, versus just 5 percent of the public colleges' funds. Only 17 percent of the public colleges' building dollars, but nearly 28 percent of the private colleges' dollars, came from institutional funds. More funds at the private colleges than at the public ones came from "other sources," 18 percent versus 9 percent. These "other" sources include such things as internal loans, commercial loans, and taxable bonds.

Top Construction and Renovation Priorities

The colleges were asked to identify their top construction and renovation priorities by facilities types. About 30 percent said that classrooms were their top construction priority. A little more than half as many, 17 percent, said that constructing laboratories ranked first, and 10 percent each said special use and library facilities were their most important targets. Table III-13 shows that classrooms were the top priority for all college types but the medical colleges. Their top priority was health care facilities. Laboratories were among the "top three" construction priorities at all but the HBCUs and private masters universities. Special use facilities, such as athletic or physical education facilities, media production units, or armories, made the top three in construction priorities at five college types: private research universities, masters universities and four-year colleges, doctoral universities, and two-year colleges. Libraries made the top three at public research universities, masters universities, and four-year colleges, and the private four-year colleges. General use facilities, such as assembly and exhibition halls, and food, day care, and recreation facilities, were among the top three priorities at private masters universities and the HBCUs. Constructing residences was of major priority to only the HBCUs.

Table III-14 shows that classrooms were the top *renovation* priority for the responding colleges combined. Classrooms were, however, the top priority for only five individual college types: public research universities, public four-year/masters colleges and universities, private masters universities, the HBCUs, and two-year colleges. The top renovation priorities at the other four college types included laboratories at the private research and the doctoral universities, residences at the private four-year colleges, and health care facilities at the medical colleges.

TABLE III-13 Respondents' Top Construction Priorities, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Classrooms	28.2%	23.8%	32.5%	29.3%	29.0%
Residential	2.2	9.5	8.1	3.1	9.7
Offices	0.0	4.8	2.7	4.6	3.2
Laboratories	34.8	28.5	13.5	13.8	6.4
General Use	0.0	4.8	8.1	10.8	12.9
Special Use	2.2	14.3	13.5	9.2	19.5
Libraries	17.4	9.5	10.8	16.9	9.7
Support	2.2	0.0	5.4	3.1	3.2
Health Care	0.0	4.8	0.0	0.0	0.0
Non-Assignable	0.0	0.0	0.0	0.0	0.0
Infrastructure	13.0	0.0	5.4	9.2	6.4
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	46	21	37	65	31

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Classrooms	25.4%	34.4%	42.0%	11.1%	29.7%
Residential	7.5	21.9	8.0	0.0	7.3
Offices	6.0	9.4	2.0	0.0	3.8
Laboratories	14.9	6.3	14.0	33.3	17.2
General Use	11.9	18.7	6.0	0.0	8.7
Special Use	14.9	3.1	12.0	0.0	10.4
Libraries	14.9	0.0	4.0	0.0	10.9
Support	0.0	0.0	2.0	5.6	2.2
Health Care	0.0	3.1	4.0	44.4	3.3
Non-Assignable	0.0	0.0	6.0	0.0	0.8
Infrastructure	4.5	3.1	0.0	5.6	5.7
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	67	32	50	18	367

Classrooms were among the top three renovation priorities at all but the medical colleges. Laboratories made the top three at seven college types: public and private research universities, doctoral universities, public four-year/masters colleges, private four-year colleges, two-year colleges, and the medical colleges. Residences also made the top three at seven college types: private research universities, doctoral universities, public four-year/masters colleges, private masters universities and four-year colleges, the HBCUs, and the medical colleges. Renovating offices was especially important to the private masters universities and the two-year colleges. Infrastructure was among the top three renovation priorities at public research universities and the four-year/masters colleges.

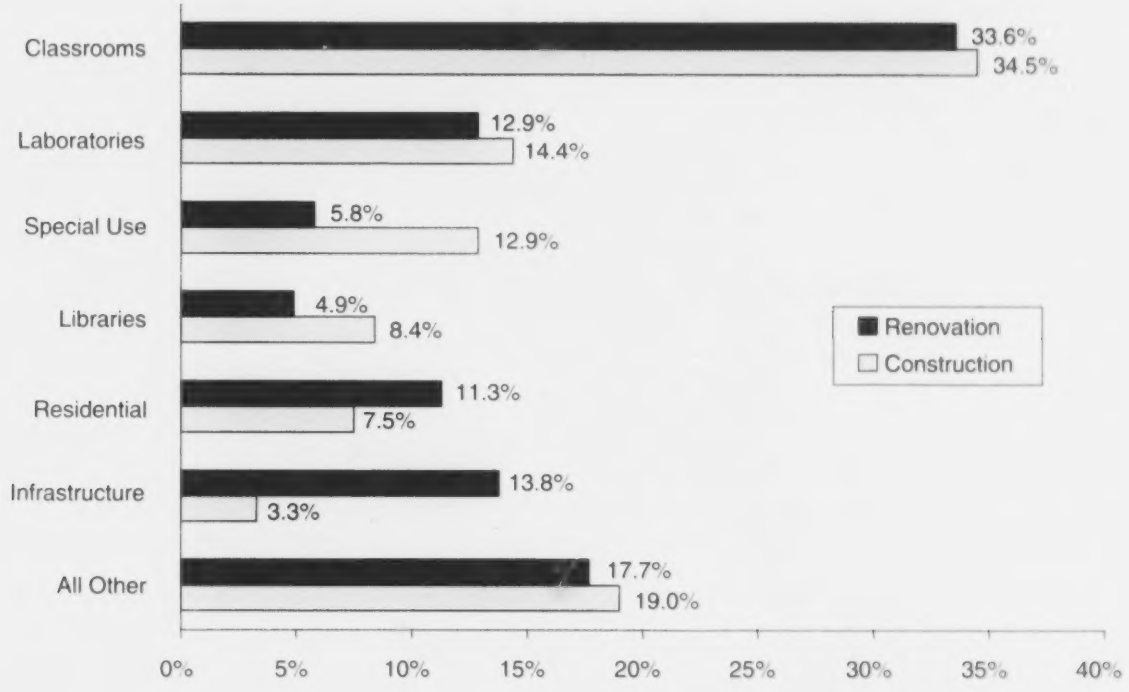
TABLE III-14 Respondents' Top Renovation Priorities, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Classrooms	43.8%	20.0%	27.8%	36.3%	29.0%
Residential	2.1	20.0	13.9	11.6	22.5
Offices	4.2	0.0	8.3	8.7	19.4
Laboratories	33.3	30.0	30.6	11.6	6.5
General Use	0.0	5.0	5.5	0.0	6.5
Special Use	0.0	5.0	0.0	0.0	9.7
Libraries	4.2	5.0	2.8	5.8	0.0
Support	0.0	0.0	2.8	2.9	0.0
Health Care	0.0	5.0	0.0	1.4	3.2
Non-Assignable	0.0	0.0	0.0	0.0	3.2
Infrastructure	12.5	10.0	8.3	21.7	0.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	48	20	36	69	31

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Classrooms	21.4%	44.2%	40.8%	6.3%	32.2%
Residential	31.4	17.6	4.1	12.4	15.3
Offices	11.4	5.9	6.1	0.0	8.0
Laboratories	12.9	5.9	10.3	31.3	17.2
General Use	7.2	8.8	6.1	0.0	4.3
Special Use	4.3	2.9	6.1	0.0	2.9
Libraries	1.4	5.9	4.1	0.0	3.5
Support	0.0	0.0	0.0	0.0	0.8
Health Care	0.0	0.0	0.0	37.4	2.4
Non-Assignable	0.0	2.9	2.0	6.3	1.1
Infrastructure	10.0	5.9	20.4	6.3	12.3
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	70	34	49	16	373

The respondents' priorities for the various facility types were weighted to produce an estimate of the construction and renovation priorities of all colleges. The results are displayed in Figure III-2. Classrooms are the top priority for both renovation and construction at one-third of all colleges. Laboratories are the top renovation priority at 13 percent of colleges and the top construction priority at 14 percent. Special use facilities and libraries were more likely to have been identified as top construction than renovation priorities, 13 percent versus 6 percent, and 8 percent versus 5 percent, respectively. Just the opposite was true for residential facilities and infrastructure, which were more likely to be renovated than constructed.

Figure III-2 Percentages of Colleges Identifying Top Priority Construction and Renovation Needs, By Facilities Categories



Work on Top Construction and Renovation Priorities

The colleges' top construction and renovation priorities were compared to reports of their construction and renovation activities. Table III-15 shows that about 92 percent of respondents chose a top priority construction project and 93 percent chose a top priority renovation project. However, only 37 percent of the colleges were working on their top renovation priority. Just 33 percent were working on their top construction priority.

The patterns varied by college types. About six out of ten research universities and medical colleges were working on their top construction priorities. However, only 19 percent to 31 percent of the other college types were working on their top priorities. More than six out of ten public research universities and medical colleges, and more than five out of ten private research universities and doctoral universities, were renovating their top priority facility. About 41 percent of the HBCUs, but

TABLE III-15 Percentages of Colleges Constructing or Renovating Their Top Priority Projects, By College Types

	Construction		Renovation	
	Pct Choosing	Pct Working	Pct Choosing	Pct Working
Public Research	92.0%	60.9%	96.0%	62.5%
Private Research	100.0	57.1	95.2	55.0
Doctoral Universities	97.4	24.3	94.7	50.0
Public 4-Year/Masters	87.8	24.6	93.2	23.1
Private Masters	93.9	22.6	93.9	29.0
Private 4-Year	91.8	19.4	95.9	25.7
Public/Private HBCUs	88.9	31.2	94.4	41.1
2-Year Colleges	87.7	28.0	86.0	20.4
Medical Colleges	100.0	61.1	88.9	68.8
All Respondents	91.8%	32.7%	93.3%	36.7%

only 24 percent of the remaining five college types, were working on their top renovation projects. Thus it appears that the smaller the colleges, the less likely they were to have been working on either their top construction or renovation project.

Since only one-third of the colleges reported working on their top priority projects, it was not surprising that six out of ten colleges were *not* working on their top priorities and renovation projects, 62 percent and 59 percent, respectively. Table III-16 shows that over 73 percent of the doctoral universities, private masters universities, and private four-year colleges were *not* working on their top construction priorities. Over 61 percent of the public four-year/masters colleges, HBCUs, and the two-year colleges, were not addressing their prime construction need. The research universities and medical colleges were more likely than the others to have been working on their top priorities, with only about four out of ten being unsuccessful. The colleges were similarly unsuccessful at addressing their top renovation priorities.

The bottom of Table III-16 shows that 18 percent of respondents had classrooms as their top priorities and were not working on them. About one out of eleven colleges wanted to renovate either laboratories or residential facilities but were not doing so. About one out of twelve wanted but were unable to construct laboratories.

The respondents' top priority construction and renovation projects were compared to future plans. It was discovered that about 58 percent of the colleges were either working on, or planned to start work on, their top priority construction projects. This means that approximately 40

TABLE III-16 Percentages of All Respondents With No Current Construction or Renovation On Their Top Priorities, By College Types And Facility Types

	Construction	Renovation
Public Research Universities	36.0%	36.0%
Private Research Universities	42.9	42.9
Doctoral Universities	73.7	47.4
Public 4-Year/Masters	66.2	71.6
Private Masters	72.7	66.7
Private 4-Year	74.0	71.2
Public/Private HBCUs	61.1	55.5
2-Year Colleges	63.1	68.4
Medical Colleges	38.9	27.7
All Colleges	62.0%	59.0%

	Construction	Renovation
Classrooms	17.5%	18.3%
Laboratories	8.8	9.5
Residential	5.5	9.3
Infrastructure	4.0	8.0
Libraries	7.3	2.3
Special Use	6.3	2.0
General Use	6.5	3.0
Offices	2.8	4.0
Health Care	1.0	1.0
Support	1.5	0.8
Non-Assignable	0.8	0.8
All	62.0%	59.0%

percent of all responding colleges had a top priority construction project that still needed attention.

About 51 percent of the colleges were addressing or would soon address their top priority renovation projects. This would mean that about half the responding colleges had a top priority renovation project not receiving attention.

Summary and Conclusions

This chapter described the construction and renovation activities on college campuses. About 46 percent of survey respondents reported working on construction projects, 49 percent reported working on renovation projects, and 31 percent were doing both at the time of the sur-

vey. Over 25 percent were constructing laboratories or classrooms; between 20 and 23 percent were constructing special use, support, or office facilities; between 17 percent and 19 percent were constructing library, general use, residential, or infrastructure facilities; and just under 13 percent were constructing health care facilities. The leading renovation categories were: classrooms, 33 percent; offices, 29 percent; laboratories, 26 percent; and residential facilities, about 24 percent.

The responding colleges' average construction projects totaled 174,000 gross square footage; their average renovation projects totaled 136,000 gross square footage. The colleges that reported their expenditures were, on the average, $25.4 million for all their construction projects and $12.6 million for all renovation projects. It was estimated that America's colleges and universities were constructing about 90 million GSF and renovating about 80 million GSF at the time of the survey. Staff estimated that the GSF under construction represented about 2.5 percent of all campus gross square footage. Staff estimated that all colleges were spending about $12 billion on construction and $7 billion on renovation projects.

When it came to future projects, 54 percent of the respondents said they would start construction projects, 56 percent would start renovation projects, and 36 percent would start both in 1995–96 and/or 1996–97. The staff best estimate of aggregate gross square footage to be constructed is 107 million for construction and 98 million for renovations. The colleges will likely spend $14 billion on construction and $5 billion on renovation projects in the near future.

State funds were the primary source of building dollars for all but the *private* four-year/masters colleges, who paid for building activities with institutional funds, private gifts, and tax-exempt bonds. Their sources of funding for building projects varied most by whether the colleges were public or private in control. State funds accounted for 45 percent of the dollars at the public four-year colleges, but only 2 percent at the private ones. On the other hand, private and foundation gifts accounted for 32 percent of the private colleges' building funds, versus just 5 percent of the public colleges' funds.

The responding colleges' top construction priorities were classrooms, laboratories, libraries, and special use facilities. Their top renovation priorities were classrooms, laboratories, and residential facilities. Only 37 percent of responding colleges were working on their top renovation and just 33 percent were working on their top construction priorities. When their building priorities were considered, it was discovered that 40 percent of the colleges were not addressing their top construction

priorities and about 50 percent were not addressing their top renovation priorities.

The survey found that significant proportions of America's colleges and university campuses were involved with construction and renovation projects. On the average, they each were spending millions and, in total they were spending billions. Through construction they are expanding their aggregate gross square footage at about 2.5 percent per year. Nevertheless, a great number of colleges were not addressing their top construction and renovation priorities and they had no immediate plans to do so.

Note

1. Readers should be apprised that the dollars expenditures reported here are *for projects*, not for a single year.

Part IV

Accumulated Deferred Maintenance at Colleges and Universities

APPA and NACUBO staff conversations with college facilities administrators suggested that the deferred maintenance problem on America's campuses has worsened. Therefore, a major purpose of this survey was to quantify accumulated deferred maintenance (ADM), how it has changed since the 1988 benchmark study, and what colleges have done to address their situations.

How Accumulated Deferred Maintenance Is Assessed

Before discussing changes in ADM, it might be helpful to describe how it is assessed. Eight out of ten survey respondents reported conducting periodic facility audits to determine their maintenance needs (see supplemental Table IV-A at the end of this chapter). Private four-year colleges, two-year colleges, the historically black colleges and universities (HBCUs), public research universities, and medical colleges were less likely than other colleges to report conducting audits, 10 percent versus 23 percent. Of the colleges that conducted audits, 57 percent used only walk-through methods of assessment, about 3 percent used only formulas, and 40 percent used a combination of both types of audits. Only 15 percent of private research universities, but 36 percent of all other college types used formulas. There were no other major differences in types of facilities audit procedures used by different college types.

More than half the respondents who reported audits said they do them annually and two-thirds reported doing them at least biannually (see Table IV-B). Only one out of five colleges takes four or more years between these audits.

How Accumulated Deferred Maintenance Has Changed

Table IV-1 shows that about half the responding colleges said their accumulated deferred maintenance (ADM) increased since 1988. But 41 percent said theirs had decreased (23.5 percent) or remained the same (17.5 percent) since the earlier study. About 9.5 percent of respondents said they did not know if their ADM had changed.

The patterns of changes in ADM generally did not vary by college types. However, public research universities were significantly *more* likely than others to say their ADM *increased*, 76 percent versus 46 percent. Private four-year colleges were significantly *more* likely than others to say their ADM *decreased*, 45 percent versus 19 percent. Two-year colleges were significantly more likely to report not knowing whether their ADM had changed, 23 percent versus 7 percent.

TABLE IV-1 How Accumulated Deferred Maintenance Has Changed Since 1988, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Increased	76.0%*	42.9%	57.9%	62.2%	36.4%
Decreased	8.0*	23.8	21.0	16.2	36.4
Same	14.0	23.8	15.8	13.5	18.2
No Answer	2.0	9.5	5.3	8.1	9.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	50	21	38	74	33

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Increased	32.9%*	47.2%	40.3%	38.9%	49.5%
Decreased	45.2*	22.2	12.3	27.8	23.5
Same	12.3	25.0	24.6	22.2	17.5
No Answer	9.6	5.6	22.8*	11.1	9.5
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	73	36	57	18	400

*Indicates percentages are statistically significantly different from other row percentages, at the 0.05 level of significance.

Costs of Eliminating Accumulated Deferred Maintenance

The survey asked for estimates of how much total funding would be necessary to eliminate ADM on the campuses. The total for the 348 colleges responding to this survey question was about $7.8 billion, or approximately $22.6 million per campus. However, ADM amounts were not huge everywhere. About 17 percent said the amount was under $1 million on their campuses and half estimated under $7.5 million in ADM. Total ADM amounts below $3 million were reported by 20 percent of public four-year/masters colleges, 51 percent of private four-year/masters colleges and the HBCUs, and 65 percent of two-year colleges.

The research universities reported huge ADM amounts, with 28 percent reporting over $100 million and half reporting more than $66.5 million. Only 10 percent of doctoral universities reported amounts more than $66.5 million. Table IV-2 displays the data.

One purpose of this study was to estimate the total funding needed to eliminate all deferred maintenance on all campuses across the nation. Because the colleges that responded to the survey were not statistically representative of all college types, it is difficult to calculate a precise estimate. However, some reasonable estimates are possible. Table IV-3 shows that the average total ADM per college type ranged from $4.8 million for the two-year colleges to $63.9 million for the public research universities. The weighted average for all colleges would be about $10 million, *if the ADM means for the responding colleges represented the ADM means for all college types.*

The responding doctoral universities, public research universities, and private research universities very likely represent all such universities. The respondents from the other types of colleges generally were larger in size than the non-respondents. It is likely that the ADM means for the responding research and doctoral universities are similar to the means for all such institutions. It is likely that the ADM means for all other college types were *larger* than non-respondent means, because the responding colleges were *larger* in size. Therefore, it was assumed that the non-responding colleges' mean total ADM amounts were proportionately smaller.

Table IV-3 shows three estimates of the total ADM for all colleges, not just responding ones. The "middle" estimate is based on the assumption that the respondent means typify the population means. The "low" estimate is based on assumptions that: (1) the respondent means for the research and doctoral universities are 5 percent higher than the means

TABLE IV-2 Total Funding Necessary To Eliminate ADM At The End Of 1994–95, By College Types

Millions	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Under $1.00	4.5%	11.1%	3.1%	4.5%	17.8%	23.5%	31.0%	41.4%	13.3%	17.0%
$1 to $2.9	0.0	0.0	6.2	16.4	25.0	30.9	20.7	23.9	13.3	17.2
$3 to $6.9	0.0	5.6	6.2	25.4	25.0	20.6	17.2	13.0	0.0	14.9
$7 to $10.9	2.2	0.0	18.9	11.9	3.6	7.4	6.9	2.2	13.3	7.5
$11 to $14.9	4.5	0.0	3.1	8.8	3.6	1.5	6.9	4.3	13.3	4.9
$15 to $20.9	4.5	11.1	21.9	7.5	14.3	8.8	10.3	6.6	26.7	10.3
$21 to $29.9	2.2	11.1	12.5	7.5	7.1	4.4	0.0	4.3	6.7	5.8
$30 to $44.9	8.8	5.6	0.0	6.0	3.6	2.9	3.5	0.0	6.7	4.0
$45 to $53.9	13.3	5.6	9.4	3.0	0.0	0.0	0.0	0.0	0.0	3.4
$54 to $59.9	4.5	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.9
$60 to $69.9	11.1	11.1	9.4	0.0	0.0	0.0	0.0	0.0	0.0	2.9
$70 to $79.9	17.8	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	2.6
$80 to $89.9	2.2	0.0	3.1	3.0	0.0	0.0	0.0	0.0	0.0	1.1
$90 to $99.9	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
$100 or More	24.4	33.2	3.1	4.5	0.0	0.0	3.5	4.3	6.7	7.2
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$63.1	$48.0	$17.4	$9.2	$6.3	$2.7	$2.8	$1.7	$14.5	$7.5
Number	45	18	32	67	28	68	29	46	15	348

TABLE IV-3 Estimated Average and Total ADM For All Colleges, By College Types (dollar amounts in millions)

	Average ADM*	Low	Middle	High
Public Research	$63.9	$5,160	$5,432	$5,703
Private Research	59.1	2,190	2,305	2,420
Doctoral Universities	24.6	2,524	2,657	2,790
Public 4-Year/Masters	19.2	5,890	7,392	7,762
Private Masters	8.4	1,557	2,108	2,213
Private 4-Year	6.5	2,224	3,263	3,426
Public/Private HBCUs	6.3	481	617	648
2-Year Colleges	4.8	4,549	6,864	7,207
Medical Colleges	19.7	1,033	1,418	1,489
All Colleges		$25,608	$32,056	$33,658

*Averages are for the responding colleges.

for their populations, and (2) the respondent means for the other college types are from 18 percent (for the medical colleges) to 57 percent (for the HBCUs) higher than the means for their respective populations. This is because the responding colleges were this much larger in size than the population colleges. The " high" estimate is based on the assumption that all respondent ADM means were 5 percent lower than their respective population means, a very unlikely possibility.

The aggregate estimates range from $25.6 billion to $33.7 billion, with a "middle" estimate of $32 million. It is likely that the actual aggregate total ADM for all U.S. colleges is closer to $25 billion than to $32 billion. *The staff best estimate of aggregate ADM is $26 billion.*

Although the research and doctoral universities represented just 8 percent of all colleges, and they had about 35 percent of the aggregate GSF, they had an estimated 38 percent of the total ADM. The public four-year/masters colleges represented 13 percent of all colleges and had 21 percent of the aggregate GSF, but they had about 23 percent of the ADM. Therefore, one-fifth of the colleges had three-fifths of the ADM.

The proportions of estimated total ADM at each college type generally corresponded to the type's share of total GSF. Here are the two values:

	Percent of ADM	Percent of GSF
Public Research Universities	20%	20%
Private Research Universities	8%	6%
Doctoral Universities	10%	9%
Public 4-Year/Masters	23%	21%
Private Masters	6%	6%
Private 4-Year	9%	10%
Public/Private HBCUs	2%	3%
2-Year Colleges	18%	17%
Medical Colleges	4%	5%

The study staff compared the ADM at each college with its current funds expenditures for 1993–94 and the total replacement value of its buildings. Table IV-4 shows that the ADM amounts were equivalent to about 11.5 percent of the colleges' total current funds expenditures, the median percentage for all respondents. Over one fourth had ADM amounts equivalent to under 5 percent of their current funds expenditures. But total ADM amounts exceeded 23 percent of expenditures at the same proportion of respondents. ADM amounts were distributed unevenly among colleges and so were the percentages of expenditures those amounts represent.

The median percentages for five college types were in double-digits, with the 18 percent median for public four-year/masters colleges the highest. Although the medians for research universities and doctoral universities were fairly similar, one fourth of the latter had 33 percent or higher values.

The median ADM amount for four-year private colleges was 57 percent less than the median amount for private masters universities. However, the ADM amount in comparison to total current funds expenditures was much higher for the private colleges than the private universities, 11.5 percent versus 7 percent. Therefore, the private colleges generally would have to incur greater relative expenses to handle their ADM.

Table IV-5 shows a median value of 7 percent for total ADM divided by the total replacement values of buildings. Put another way, the typical amount colleges reported they would have to spend to eliminate ADM equaled 7 percent of their physical plant replacement values.

For four out of every ten respondents, total ADM represented under 5 percent of the total replacement value of their buildings. Another three out of ten had ADM amounts equal to between 5 and 11 percent of their buildings' replacement values. The ADM values for the remaining three out of ten colleges were more than 11 percent of their buildings' value. Therefore, relative to their building replacement values, total ADM

TABLE IV-4 Total ADM As A Percentage Of Current Funds Expenditures, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Under 1%	4.4%	11.1%	6.3%	3.0%	7.1%
1 to 2.9%	8.9	11.1	0.0	4.5	7.1
3 to 4.9%	6.7	5.6	9.4	11.9	25.0
5 to 6.9%	4.4	5.6	9.4	9.0	10.7
7 to 8.9%	8.9	5.6	12.5	3.0	7.1
9 to 12.9%	15.6	11.1	15.6	6.0	7.1
13 to 16.9%	6.7	11.1	3.1	10.4	3.6
17 to 22.9%	20.0	11.1	9.4	11.9	14.3
23 to 32.9%	13.3	22.2	9.4	11.9	0.0
33% Or More	11.1	5.6	25.0	28.4	18.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	14.0%	13.0%	12.0%	18.0%	7.0%
Number	45	18	32	67	28

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Under 1%	11.9%	13.8%	15.9%	26.7%	9.6%
1 to 2.9%	7.5	10.3	11.4	13.3	7.5
3 to 4.9%	7.5	20.7	9.1	13.3	11.3
5 to 6.9%	6.0	10.3	4.6	6.7	7.3
7 to 8.9%	7.5	3.5	9.1	20.0	7.5
9 to 12.9%	11.9	3.5	6.8	13.3	9.9
13 to 16.9%	7.5	10.3	11.4	0.0	7.8
17 to 22.9%	7.5	0.0	9.1	0.0	10.1
23 to 32.9%	11.9	3.5	4.6	0.0	9.3
33% Or More	20.8	24.1	18.0	6.7	19.7
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	11.5%	6.0%	9.0%	4.0%	11.5%
Number	67	29	44	15	345

amounts on many campuses appear quite high, whatever their college types. The median values for the different college types were similar. However, given the biases in the respondents, it is impossible to say whether the median values for all colleges in their respective populations were significantly different.

Figure IV-1 shows that under 2 percent of all colleges were estimated to have ADM over $100 million but 20 percent had ADM over $15 million. Over 52 percent had less than $3 million in ADM, with 31 percent having under $1 million.

TABLE IV-5 Total ADM As A Percentage Of Total Replacement Value of Buildings, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Under 1%	8.8%	21.4%	8.3%	2.0%	11.5%
1 to 2.9%	5.9	7.1	8.3	20.0	26.9
3 to 4.9%	17.7	7.1	20.8	12.0	7.7
5 to 6.9%	14.7	14.3	8.3	4.0	7.7
7 to 8.9%	11.8	7.1	16.7	8.0	11.5
9 to 10.9%	14.7	7.1	4.2	18.0	11.5
11 to 12.9%	2.9	21.4	12.5	4.0	3.9
13 to 14.9%	2.9	0.0	0.0	2.0	0.0
15% Or More	20.6	14.3	20.8	30.0	19.3
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	7.5%	7.0%	7.5%	9.4%	6.7%
Number	34	14	24	50	26

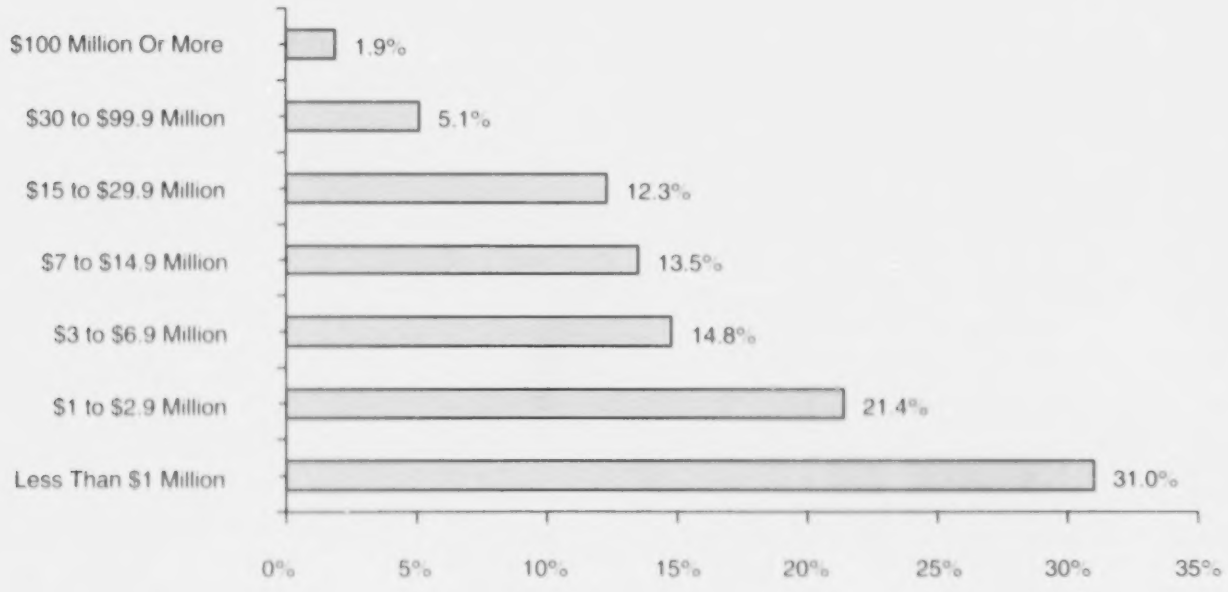
	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Under 1%	18.9%	16.7%	16.7%	11.1%	12.2%
1 to 2.9%	15.1	33.3	16.7	0.0	15.9
3 to 4.9%	11.3	5.6	11.9	22.2	12.6
5 to 6.9%	9.4	5.6	9.5	11.1	8.9
7 to 8.9%	7.6	0.0	2.4	0.0	7.8
9 to 10.9%	7.6	11.1	11.9	22.2	11.9
11 to 12.9%	5.7	0.0	4.8	0.0	5.6
13 to 14.9%	3.8	0.0	4.8	11.1	2.6
15% Or More	20.6	27.7	21.3	22.2	22.5
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	6.0%	3.0%	6.0%	9.5%	7.0%
Number	53	18	42	9	270

Urgent ADM Amounts

The colleges were asked to estimate the proportion of their ADM which should be considered urgent. "Urgent ADM" was defined as conditions that, if not attended to now, will further deteriorate and become even more costly to remedy in the future.[1] The median estimated percentage of "urgent ADM" amounts on the responding campuses was about 23 percent.

About 37 percent of doctoral universities, private masters universities, two-year colleges, and medical colleges said under one-tenth of their

Figure IV-1 Percentages of Colleges With Various Levels of Accumulated Deferred Maintenance



ADM was considered urgent. On the other hand, about 26 percent of these same types of colleges said that over half their ADM amounts were urgent.

About 21 percent of research universities, public four-year and masters colleges, private four-year colleges, and HBCUs said that only one-tenth of their ADM was urgent. But 20 percent of them said half their ADM was urgent. Therefore, the distributions of "Urgent ADM" percentages in Table IV-6 seem bimodal, with substantial proportions of each college type having little and others lots of "Urgent ADM." Figure IV-2 shows that almost two-thirds of all colleges had under $1 million, and only 19 percent had more than $3 million, in "Urgent ADM."

How ADM is Apportioned by Type of College Facility

The survey asked colleges to apportion their ADM dollar amounts to the different types of facilities on their campuses. Table IV-7 shows that over half the ADM amounts fell in just three facilities categories: classrooms, 19 percent; infrastructure, 18 percent; and residential, 17 percent.

TABLE IV-6 Percentages Of Total ADM Considered Urgent, By College Types

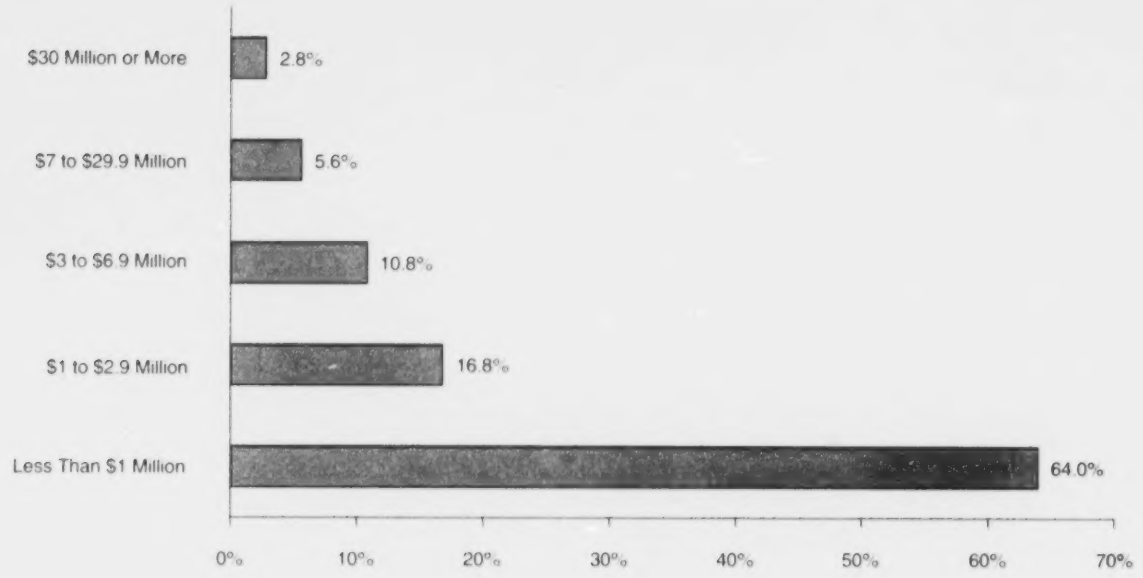
	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Below 10 Percent	12.5%	20.0%	41.7%	24.1%	32.0%
10 to 19 Percent	27.5	30.0	16.7	17.2	16.0
20 to 29 Percent	25.0	30.0	16.7	17.2	32.0
30 to 39 Percent	15.0	20.0	8.3	20.7	4.0
40 to 49 Percent	2.5	0.0	8.3	3.4	0.0
50 to 59 Percent	7.5	0.0	0.0	5.2	4.0
60 Percent Or More	10.0	0.0	8.3	12.2	12.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	24.0%	20.0%	15.0%	25.0%	20.6%
Number	40	10	24	58	25

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Below 10 Percent	21.7%	0.0%	35.0%	40.0%	25.6%
10 to 19 Percent	23.3	33.3	12.5	10.0	19.8
20 to 29 Percent	16.7	16.7	5.0	0.0	17.6
30 to 39 Percent	3.3	0.0	5.0	10.0	10.2
40 to 49 Percent	6.7	16.7	5.0	10.0	4.8
50 to 59 Percent	8.3	0.0	10.0	10.0	6.2
60 Percent Or More	20.0	33.3	27.5	20.0	15.8
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	23.0%	30.0%	25.0%	20.0%	22.6%
Number	60	6	40	10	273

About 11 percent was allocated to laboratories, 10 percent to office facilities, and 7 percent to general use facilities. Around 5 percent each was allocated to libraries, support facilities, special use facilities, and non-assignable areas. Only 1 percent of the ADM was attributed to health care facilities. Four types of facilities were ranked first or second in magnitudes of ADM by the nine college types. Five college types said residential facilities, infrastructure, and classrooms were either first or second in ADM. Four colleges ranked laboratories this high.

There were some important differences in ADM among the college types. Only 7 percent of ADM at public and private research universities was allocated to infrastructure. The proportion at other colleges was 18 percent. The public and private research universities allocated 19 percent of their ADM dollars to laboratories while other colleges allotted under 9 percent to such facilities. Because they have relatively little on-campus housing, the two-year colleges and medical colleges allotted smaller pro-

Figure IV-2 Percentages of Colleges With Various Levels of Accumulated Deferred Maintenance



portions of ADM to residential facilities than did the other colleges, 7 percent versus 19 percent. Medical colleges and private research universities ascribed smaller proportions of their ADM to classrooms than did other college types, 9 percent versus 20 percent.

Actions to Reduce Accumulated Deferred Maintenance

Respondents were asked which, if any, of five specific actions their colleges had taken to reduce ADM. Table IV-8 shows that *over seven out of ten colleges had undertaken strategic facilities planning to rank their needs.* Half made more funds available for facility upkeep and three out of ten colleges earmarked a certain portion of their budgets for deferred maintenance. Approximately 18 percent delayed or canceled new construction to work on deferred maintenance and 12 percent raised funds for maintenance endowments for new buildings.

Actions taken to reduce ADM varied by college types. For example, 80 percent of private four-year colleges and universities and 71 percent of public four-year colleges and universities, but only 53 percent of two-year colleges and 38 percent of medical colleges, had undertaken strategic facilities planning. About 81 percent of private research universities,

TABLE IV-7 Percentage Of Total Accumulated Deferred Maintenance By Types Of Facilities, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Classrooms	16.8%	9.2%	18.1%	22.2%	14.9%
Infrastructure	7.1	8.3	21.5	20.1	14.9
Residential	18.7	23.7	17.9	13.6	23.2
Laboratories	20.1	16.5	9.5	11.5	4.3
Offices	9.5	9.4	10.6	9.0	14.3
General Use	7.6	6.2	6.2	4.4	7.5
Special Use	5.5	5.7	3.1	4.7	8.2
Libraries	4.4	3.7	4.0	4.1	5.3
Support	4.5	4.9	3.6	5.3	3.1
Non-Assignable	5.4	9.4	4.4	4.5	3.7
Health Care	0.4	3.0	1.1	0.6	0.6
Number	30	10	21	54	23

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Classrooms	17.7%	22.0%	24.4%	9.2%	18.8%
Infrastructure	13.6	11.1	27.1	23.1	18.3
Residential	27.2	27.1	5.3	11.7	16.9
Laboratories	6.9	9.1	8.8	13.0	10.5
Offices	8.8	6.9	10.6	7.5	9.7
General Use	7.9	3.1	10.5	4.6	6.8
Special Use	6.0	3.4	3.0	1.4	4.9
Libraries	5.4	5.4	3.3	4.8	4.5
Support	4.4	2.4	2.8	7.0	4.3
Non-Assignable	1.6	4.0	3.7	8.4	4.2
Health Care	0.5	5.5	0.5	9.3	1.1
Number	57	8	27	8	238

30 percent of two-year colleges, and 51 percent of all other colleges reported increasing funds for facilities maintenance.

Private research universities were more likely than other four-year colleges to earmark budget funds for ADM purposes, 67 percent versus 52 percent. One-third of two-year colleges took this action. There were no statistically significant differences in the percentages of the various college types reporting delay of new construction. However, private colleges and universities were more likely than others to have raised money for maintenance endowments for new buildings, 24 percent versus 7 percent.

TABLE IV-8 Percentages Of Colleges Taking Various Steps To Address Accumulated Deferred Maintenance, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Strategic Planning	74.0%	90.5%	73.7%	68.9%	81.8%
Increased Facility Funds	48.0	80.9	50.0	45.9	54.5
Earmarked Budget	58.0	66.7	57.9	43.2	51.5
Delayed New Construction	12.0	14.3	13.2	20.2	27.3
Maintenance Endowments	4.0	28.6	10.5	2.7	21.2
Number	50	21	38	74	33

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Strategic Planning	76.7%	75.0%	52.6%	37.8%	72.3%
Increased Facility Funds	57.5	47.2	29.8	55.5	49.5
Earmarked Budget	53.4	50.0	31.5	61.1	30.0
Delayed New Construction	15.1	25.0	21.1	22.2	18.5
Maintenance Endowments	24.7	13.9	7.0	5.6	12.3
Number	73	36	57	18	400

The effects of these five actions on changes in the colleges' deferred maintenance were examined. Doing strategic facilities planning to rank order needs, earmarking certain budget amounts for ADM, and delaying or canceling new construction were all unrelated to whether the colleges' ADM estimates rose, fell, or remained about the same (see Table IV-9).

However, the colleges that made more funds available for facility upkeep were *more likely* than those who had not to report that their ADM had *fallen*, 36 percent versus 15 percent. These colleges were *less likely* to report that their ADM had *risen*, 46 percent versus 65 percent. ADM amounts fell at 45 percent and rose at only 36 percent of the colleges which raised funds for maintenance endowments. ADM amounts rose at 58 percent of the colleges that did *not* raise funds for maintenance endowments. They fell at only 23 percent. Therefore, it seems that raising funds for facilities upkeep enhanced the colleges' abilities to cut their ADM (or demonstrated their commitment to address ADM problems). The other acts, while important, did not. However, taking those other actions may have kept ADM from growing as fast as it might otherwise have grown.

The survey asked if certain situations had been beneficial to handling ADM. Table IV-10 shows that almost eight out of ten colleges said the priorities of their top college administrators had been beneficial. Over

TABLE IV-9 Effects Of Five Actions On Accumulated Deferred Maintenance

Undertaking strategic facilities planning to prioritize needs

		ADM Rose	ADM Fell	ADM Same
Percent Doing	76.5%	54.0%	28.6%	17.4%
Percent Not Doing	23.5%	57.0%	17.6%	24.7%

Earmarking a certain amount in budget for ADM

		ADM Rose	ADM Fell	ADM Same
Percent Doing	54.0%	52.1%	27.8%	20.1%
Percent Not Doing	46.0%	58.2%	24.2%	17.6%

Making more funds available for facility upkeep

		ADM Rose	ADM Fell	ADM Same
Percent Doing	52.4%	45.8%	35.6%*	18.6%
Percent Not Doing	47.6%	64.9%*	15.2%	19.9%

Delaying or canceling new construction

		ADM Rose	ADM Fell	ADM Same
Percent Doing	20.3%	64.4%	20.5%	15.1%
Percent Not Doing	79.7%	52.3%	27.5%	24.2%

Raising funds for maintenance endowments for new buildings

		ADM Rose	ADM Fell	ADM Same
Percent Doing	13.2%	36.0%	44.7%*	19.1%
Percent Not Doing	86.8%	58.1%*	22.9%	19.0%

*Percentage is statistically significantly different from other column percentage, at the 0.05 level of significance.

seven out of ten said that trustee and/or legislature support had helped. Six out of ten felt that budgetary strategies were beneficial in dealing with ADM. Almost five out of ten said their colleges' financial conditions were helpful and two out of ten said that state appropriations had enhanced their ability to deal with ADM.

The beneficial situations described in Table IV-10 were compared to changes in the colleges' ADM amounts. Only two of the five situations were related statistically and significantly to ADM reductions since 1988. ADM amounts fell at 35 percent of the colleges that had adopted budgetary strategies for dealing with deferred maintenance. They fell at only 20 percent of the colleges without such strategies. ADM amounts fell at 36 percent of the colleges that reported positive financial conditions. They fell at only 21 percent of all other colleges.

Top administrator priorities, trustee and/or legislature support, and increases in state appropriations were not statistically related to changes in ADM amounts. However, these positive situations could have suppressed

TABLE IV-10 Percentage Of Respondents Identifying Situations As Beneficial To Handling Deferred Maintenance, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA
Top Administrator Priorities	84.2%	78.6%	78.3%	79.7%
Trustee or Legislature Support	59.5	92.9	68.2	65.1
Budgetary Strategies	61.5	92.9	52.2	58.5
State Appropriations	42.9	0.0	40.9	30.0
College Financial Condition	40.5	64.3	53.3	36.9
Number	42	14	23	64

	Private Masters	Private 4-Year	2-Year Colleges	Medical Colleges
Top Administrator Priorities	69.2%	80.9%	85.3%	72.7%
Trustee or Legislature Support	84.0	86.4	70.5	63.6
Budgetary Strategies	46.0	63.8	51.5	63.6
State Appropriations	10.0	15.8	20.8	0.0
College Financial Condition	50.0	50.0	50.0	40.0
Number	26	63	34	11

the growth in ADM amounts since 1988. Although ADM amounts rose at over half the colleges reporting these positive situations, the growth rates might have been even larger without them. Table IV-11 displays the data.

TABLE IV-11 Effects Of Beneficial Situations On Accumulated Deferred Maintenance

When Situations Were Beneficial	ADM Rose	ADM Fell	ADM Same	Number
Top Administrator Priorities	54.3%	27.6%	18.1%	210
Trustee or Legislature Support	52.1	29.8	18.1	188
Budgetary Strategies	46.3	34.9*	18.8	149
State Appropriations	64.7	21.6	13.7	51
College Financial Condition	44.0	35.8*	20.2	109
When Situations Were Not Beneficial	**ADM Rose**	**ADM Fell**	**ADM Same**	**Number**
Top Administrator Priorities	55.3%	23.7%	21.0%	152
Trustee or Legislature Support	57.5	21.8	20.7	174
Budgetary Strategies	60.6*	19.7	19.7	213
State Appropriations	53.1	26.7	20.2	311
College Financial Condition	59.3*	21.7	19.0	253

*These percentages are statistically significantly higher than their opposites, at the 0.05 level of significance.

College Expenditures on Accumulated Deferred Maintenance

It was noted above that almost half the colleges said their ADM amounts had increased since 1988. The survey asked what colleges spent on deferred maintenance in 1993–94. The median expenditure was $329,000. About 25 percent spent under $25,000 and 14 percent spent over $3 million. Table IV-12 shows that expenditures on ADM varied by institutional types, from a median amount of $32,000 at two-year colleges to $4.8 million at private research universities. The differences in expenditures *within* many colleges types were also substantial. For example, here are the percentages of some colleges reporting spending under $25,000 and over $500,000 on ADM projects:

	Under $25,000	Over $500,000
Public 4-Year/Masters	24%	37%
Private 4-Year/Masters	32%	28%
Two-Year Colleges	49%	16%

The differences in expenditures on ADM within and between college types should not be too surprising, because colleges had considerably different annual total current funds expenditures. Moreover, their total ADM amounts were quite different. The amounts colleges spent on ADM as a percent of their total current funds expenditures for 1993–94 are displayed in Table IV-13. The median percentage values range from 0.10 percent for the two-year colleges to 0.55 percent for the research universities. Nearly 28 percent spent under one-tenth of 1 percent, and around 68 percent devoted under 1 percent, of their total current funds expenditures to ADM projects. Only about 12 percent spent 3 percent or more of their current funds expenditures on ADM.

Because the number of respondents was small, the differences in the percentage distributions by college types may not represent differences in their populations. However, it appears that universities devoted higher percentages of their total current funds expenditures to ADM than did four-year colleges. But four-year colleges seem to have devoted a larger share of their dollars to ADM than did two-year colleges.

TABLE IV-12 Amounts Spent On Accumulated Deferred Maintenance In 1993–94, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Under $25,000	8.1%	7.7%	9.1%	24.1%	18.2%
$25,000 to $99,999	0.0	0.0	0.0	3.7	9.1
$100,000 to $299,999	10.8	0.0	22.7	22.2	31.8
$300,000 to $499,999	2.7	0.0	13.6	13.0	9.1
$500,000 to $699,999	2.7	0.0	4.6	9.3	9.1
$700,000 to $899,999	2.7	7.7	4.6	3.7	4.6
$900,000 to $2,999,999	35.2	15.4	36.4	16.7	18.2
$3 Million or More	37.8	69.2	9.1	7.4	0.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$2,273,000	$4,800,000	$700,000	$300,000	$243,000
Number	37	13	22	54	22

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Under $25,000	37.5%	16.7%	48.7%	11.1%	25.0%
$25,000 to $99,999	12.5	16.7	13.5	22.2	7.4
$100,000 to $299,999	14.3	0.0	13.5	11.1	16.4
$300,000 to $499,999	8.9	0.0	8.1	0.0	8.2
$500,000 to $699,999	5.4	33.3	5.4	11.1	6.6
$700,000 to $899,999	3.6	16.7	2.7	0.0	3.9
$900,000 to $2,999,999	10.7	0.0	5.4	22.2	18.0
$3 Million or More	7.1	16.7	2.7	22.2	14.5
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$100,000	$600,000	$32,000	$600,000	$329,000
Number	56	6	37	9	250

TABLE IV-13 Percentage of Total Current Funds Expenditures Spent On ADM In 1993–94, By College Types

	Research Universities	Doctoral Universities	Public 4-YR/MA	Private 4-YR/MA	2-Year Colleges	All Others	All Respondents
Under 0.10%	16.3%	13.6%	26.4%	27.3%	50.0%	40.0%	27.6%
0.10 – 0.19%	12.2	4.6	7.5	6.5	5.9	0.0	7.2
0.20 – 0.29%	0.0	13.6	11.3	11.7	2.9	6.7	8.0
0.30 – 0.39%	10.2	13.6	5.7	5.2	0.0	6.7	6.4
0.40 – 0.49%	4.1	4.6	3.8	2.6	5.9	0.0	3.6
0.50 – 0.99%	24.7	31.7	9.4	11.7	11.8	6.7	15.2
1.00 – 1.99%	22.4	9.1	18.9	16.9	2.9	26.7	16.4
2.00 – 2.99%	2.0	4.6	3.8	5.2	2.9	6.7	4.0
3.00 – 3.99%	2.0	0.0	3.8	3.9	2.9	0.0	2.8
4.00 – 4.99%	4.1	0.0	0.0	1.3	5.9	0.0	2.0
5.00 Or More	2.0	4.6	9.4	7.8	8.9	6.7	6.8
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Median	0.55%	0.50%	0.38%	0.38%	0.10%	0.35%	0.42%
Number	49	22	53	77	34	15	250

Summary and Conclusions

This chapter described changes in accumulated deferred maintenance (ADM) on the college campus, factors that affected these changes, and the current ADM amounts. Just under half the colleges reported that their ADM amounts increased since 1988, about one-fourth said theirs decreased, and the remainder said theirs stayed about the same or they were not sure how it changed. Public research universities were more likely than other colleges to report increases in ADM.

It was estimated that total ADM is about $26 billion for the nation's colleges, with the largest proportion at the research and doctoral universities. They represent only 8 percent of all study population colleges but probably have 38 percent of the total deferred maintenance.

Responding colleges' total ADM amounts represented about 11.5 percent of their annual current funds expenditures. About three out of ten colleges had ADM amounts equivalent to less than 5 percent of their current funds expenditures. But an equal proportion had ADM equivalent to at least 23 percent of their expenditures.

The responding colleges' total ADM represented about 7 percent of the current replacement value of their buildings. About four out of ten colleges' ADM amounts represented under 5 percent, but three out of ten

colleges' amounts exceeded 11 percent, of the current replacement value of their buildings.

The median percentage of ADM that the respondents considered urgent was 23 percent. The distributions of "Urgent ADM" within college types were bimodal, with relatively large proportions of each type having a great deal or very little of it. It was estimated that "Urgent ADM" exceeded $3 million on about one-fifth of the nation's college campuses.

Over half the colleges' ADM was allocated to just three facilities categories: classrooms, 19 percent; infrastructure, 18 percent; and residential, 17 percent. These three facilities types and laboratories were the only types ranked either first or second in ADM amounts by all respondents.

Survey respondents had taken several actions to reduce ADM. Seven out of ten had undertaken strategic facilities planning to rank their ADM. Half had made more funds available for facilities upkeep. Three out of ten reported earmarking certain portions of their budgets for ADM purposes. Larger institutions were more likely to have done facilities planning and private colleges were more likely than public colleges to have raised money for maintenance endowments for new buildings. Increasing funds for facility upkeep and raising maintenance endowments were positively related to reductions in ADM since 1988.

The respondents identified several situations that they thought were particularly beneficial to dealing with ADM. They include: top college administrator priorities, support from boards of trustees or legislators, budgetary strategies targeted on ADM, and the financial health of the colleges. The last two situations were positively related to reductions in ADM. Although positive actions and situations were not directly related to reductions since 1988 in ADM amounts, these actions might have suppressed the growth in deferred maintenance.

While the median total ADM on respondents' campuses was $7.5 million, the median amount they spent on reducing it in 1993–94 was only $329,000. About 25 percent of colleges spent under $25,000 and only 14 percent spent over $3 million. Amounts spent varied a great deal by college types. Two-year colleges generally spent the least and private research universities spent the most. In terms of their total current funds expenditures, amounts spent on ADM were slight. Over two-thirds of the respondents devoted under 1 percent of their current funds expenditures to ADM projects. Only 12 percent spent 3 percent or more of their total funds.

Generally speaking, the accumulated deferred maintenance situation for America's colleges and universities is dichotomous. A substantial proportion of all colleges appear to have relatively small ADM problems with situations that have improved during recent years. But an equally substantial proportion faces large and increasing ADM problems. Serious ADM problems appear far from universal.

TABLE IV-A Responses To "Do You Conduct Periodic Facilities Audits To Determine Deferred Maintenance Needs?" By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
No	18.4%	10.0%	13.5%	12.3%	3.2%
Combination	38.8	10.0	32.4	33.9	35.5
Formula	2.0	5.0	2.7	4.6	3.2
Walk Through	40.8	75.0	51.4	49.2	58.1
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	49	20	37	65	31

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
No	27.3%	20.0%	25.6%	18.8%	17.7%
Combination	27.3	48.6	27.9	31.2	32.6
Formula	1.5	2.9	0.0	6.3	2.8
Walk Through	43.9	28.5	46.5	43.7	46.9
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number	66	35	43	16	362

TABLE IV-B Frequency of Periodic Facilities Audits, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Every Year	27.8%	53.8%	47.8%	47.2%	76.0%
Every 2 Years	16.7	7.7	8.7	9.4	4.0
Every 3 Years	13.9	23.1	17.4	26.4	8.0
Every 4+ Years	41.6	15.4	26.1	17.0	12.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	3.40 yrs	1.00 yrs	2.25 yrs	2.20 yrs	1.00 yrs
Number	36	13	23	53	25

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Every Year	60.9%	37.5%	62.1%	50.0%	51.9%
Every 2 Years	17.4	25.0	24.1	12.5	13.7
Every 3 Years	8.7	12.5	0.0	12.5	14.1
Every 4+ Years	13.0	25.0	13.8	25.0	20.3
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	1.00 yrs	2.50 yrs	1.00 yrs	1.00 yrs	1.00 yrs
Number	46	8	29	8	241

Part V

Colleges and the Americans with Disabilities Act

Colleges have responded in many ways to the Americans with Disabilities Act (ADA) of 1990. The survey asked what actions they had taken in the past two years, how much they spent to comply with ADA, how much they must spend to achieve compliance, and how long it will take them to reach that goal (if they have not already achieved it).

Actions Taken to Comply with ADA

The most frequently identified action steps taken to comply with ADA were completing a survey to determine necessary modifications and appointing an ADA coordinator and/or committee. Over eight out of ten respondents said they had taken these actions. Almost seven out of ten had agreed on strategies for ranking compliance needs and just over half had prepared formal plans to comply with ADA. About 45 percent had identified sources of funds for ADA modifications and 36 percent had developed long-range funding plans.

Table V-1 shows that the ADA responses varied by college types. Private masters universities and four-year colleges were less likely than their public counterparts, 67 percent versus 100 percent, to have reported at least one specific response. Over 93 percent of the research and doctoral universities, but only 81 percent of other colleges reported some response. Developing a long-range funding plan was the action *least likely* to have been taken by all but the private research universities. Fewer research universities reported preparing formal compliance plans than preparing funding plans or finding funding sources. All responding colleges were *most likely* to have completed needs surveys and appointed ADA coordinators.

The ADA holds public colleges to different standards of compliance than it does private colleges. So it is not surprising that public college respondents more frequently reported having taken action.

Here are the percentages for all public and private colleges combined:

	All Public	All Private
Completed a needs survey	91%	70%
Appointed an ADA coordinator	91	61
Developed strategy to prioritize needs	74	56
Prepared formal compliance plan	69	32
Identified funding sources	55	29
Did long-range funding plan	42	25

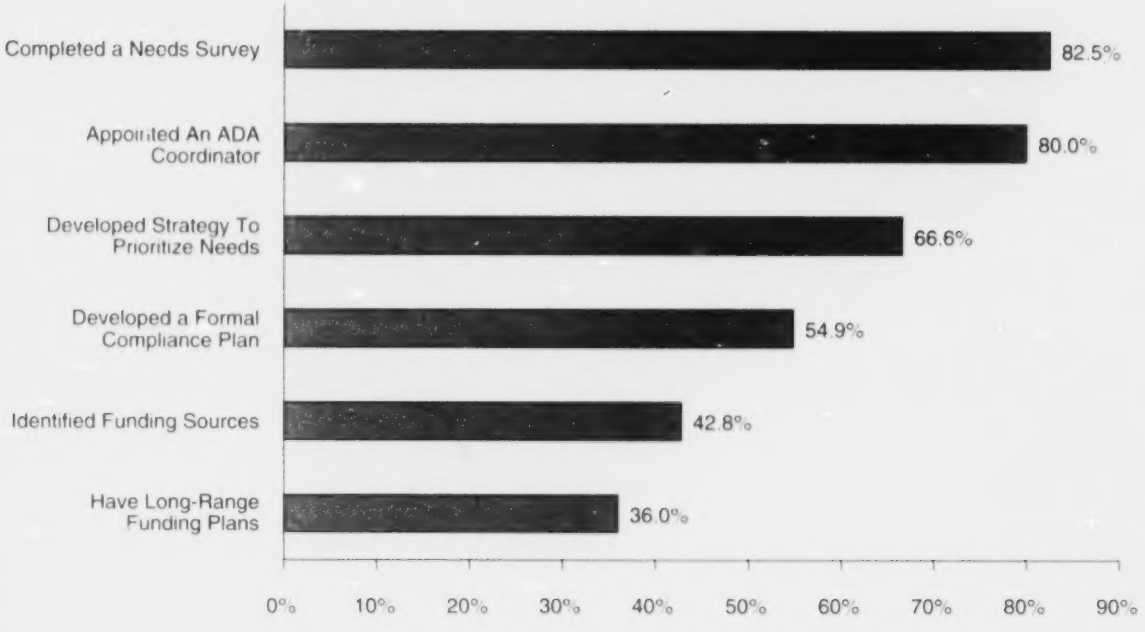
Private colleges were only about three-fourths as likely as public colleges to have completed a needs survey and developed a strategy to rank their ADA needs. Private colleges were about two-thirds as likely as public colleges to have appointed an ADA coordinator or committee. They were half as likely to have developed formal compliance plans, identified funding sources, or prepared a long-range funding plan. Figure V-1 displays the expected responses of all colleges to the ADA, assuming that actions of the survey respondents represent those of other similar colleges.

TABLE V-1 Responses To Passage Of Americans With Disabilities Act, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA
Completed a needs survey	93.5%	86.7%	96.0%	96.9%
Appointed an ADA Coordinator	95.3	86.7	88.0	100.0
Strategy to prioritize needs	83.7	80.0	76.0	76.9
Formal compliance plan	79.1	53.3	64.0	70.8
Identified funding sources	62.7	60.0	44.0	60.0
Long-range funding plan	53.5	60.0	20.0	44.6
Number	43	15	25	65

	Private Masters	Private 4-Year	2-Year Colleges	All Respondents
Completed a needs survey	63.0%	69.2%	85.1%	84.0%
Appointed an ADA Coordinator	59.3	55.4	85.1	80.8
Strategy to prioritize needs	40.7	55.4	70.2	68.1
Formal compliance plan	22.2	27.7	63.8	55.0
Identified funding sources	29.6	26.1	44.7	45.0
Long-range funding plan	14.8	26.1	40.4	35.8
Number	27	65	47	307

Figure V-1 Resources of All Colleges to ADA Compliance



ADA Investigation and Enforcement Actions

Based on the survey responses, within the past two years an estimated one out of ten colleges in the United States was subjected to an ADA investigation or enforcement action by a federal or state agency and/or was named in a complaint or suit by someone alleging failure to comply with the ADA. Table V-2 shows that the survey respondents were slightly more likely to have been sued than subjected to an investigation, 18 percent versus 13 percent, but this difference was not statistically significant.

Almost 42 percent of public research universities, but just 27 percent of private research universities, 24 percent of doctoral universities, and 21 percent of public four-year and masters colleges, reported ADA complaints or law suits. Under 7 percent of the private masters universities and four-year colleges, the two-year colleges and the medical colleges reported ADA law suits or complaints. (The eight HBCU respondents to this question were too few to produce any valid conclusions.)

Public research universities and public and private doctoral universities were more than twice as likely as other types of colleges to have been investigated or subjected to an ADA enforcement action, 26 percent

TABLE V-2 Percentages Of Colleges Named In An ADA Complaint Or Suit And/Or Subject To An ADA Investigation Or Enforcement Action, By College Types

	Complaint or Law Suit	Investigation/ Enforcement	Number of Respondents
Public Research Universities	41.9%	27.9%	43
Private Research Universities	26.6	13.3	15
Doctoral Universities	24.0	24.0	25
Public 4-Year/Masters	21.5	15.4	65
Private Masters	7.4	3.7	27
Private 4-Year	6.2	4.6	65
Public/Private HBCUs	37.5	25.0	8
2-Year Colleges	6.4	8.5	47
Public/Private Medical Colleges	8.3	8.3	12
All Respondents	17.9%	13.4%	307
All Colleges*	10.6%	9.6%	

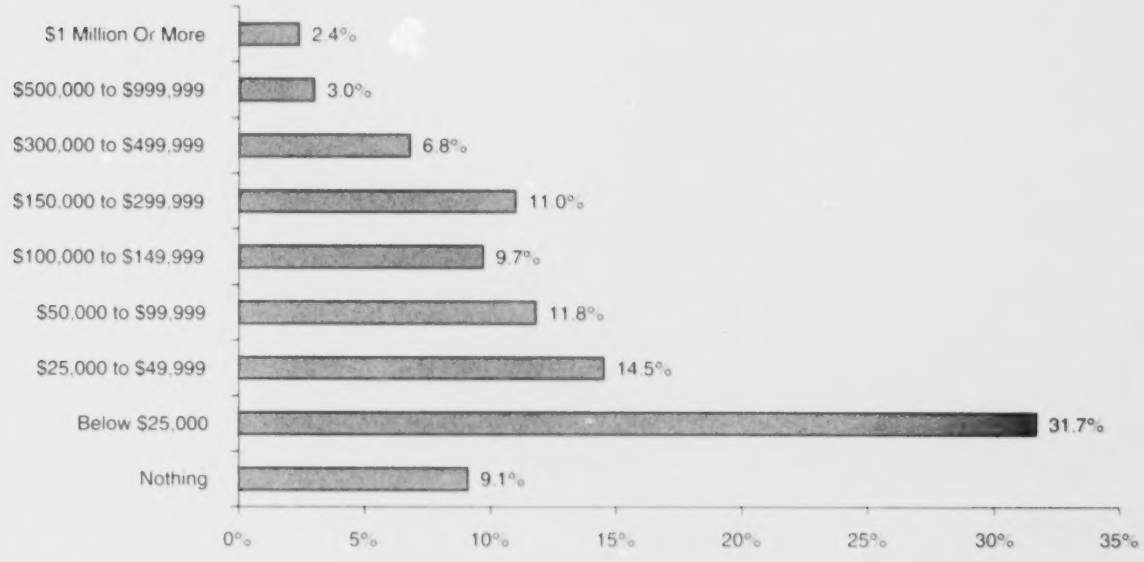
*Weighted by proportions in the population.

versus 10 percent. Larger institutions, simply due to their larger numbers of enrolled students, probably have a higher probability of being sued or investigated. Besides having fewer students and staff to sue them, or demand investigations, smaller colleges may be less impersonal and more responsive to students' ADA concerns. Public colleges were about three times as likely as private colleges to have been subjected to an investigation, 18 percent versus 6 percent. Public colleges were over twice as likely to have been named in a complaint, 23 percent versus 9 percent.

College Expenditures on ADA Compliance

The 338 survey respondents reported spending nearly $97 million, or an average of $286,300, on ADA compliance construction and renovations during the 1993–94 academic year. If these respondents represent their respective college populations, then all colleges across the nation spent almost $400 million on ADA compliance. However, because the responding colleges generally are larger than the non-respondents, the actual expenditure was probably closer to $300 million. Figure V-2 displays the estimated expenditures for ADA compliance for all colleges. These data show that over 55 percent likely spent under $50,000, with one out of eleven not spending anything. Only 5.4 percent were likely to have spent more than $500,000.

Figure V-2 Estimated 1993–94 Expenditures For ADA Compliance, All Colleges



Although the total expenditure for the responding colleges was large, more than one-fourth spent under $25,000 and half spent under $74,000 in 1993–94 (see Table V-3). One-fifth spent over $300,000. Half the colleges spending over $300,000 were larger research and doctoral universities. Only 13 percent of the smaller colleges reported spending over $300,000. The median expenditure for all public colleges was $94,000 and the median for all private colleges was $40,000.

The study staff recognized that work to address accumulated deferred maintenance (ADM) or capital renewal needs is included with projects undertaken to meet ADA requirements. Therefore, colleges were asked what proportions of their 1993–94 ADA expenditures were used to meet deferred maintenance needs. Over 63 percent said that under 10 percent of their ADA expenditures could have been assigned to deferred maintenance or capital renewal. The average was only 17 percent. Only one-fourth said that more than 20 percent of their ADA expenditures could have been assigned to deferred maintenance or capital renewal.

Dollars Needed to Achieve Full Compliance

The colleges were asked how much more they would have to spend to achieve compliance with the Act. The mean response was nearly $4 million, with 12 percent saying they would have to spend $10 million or

TABLE V-3 Expenditures For ADA Compliance In 1993–94, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
Nothing	0.0%	0.0%	0.0%	9.1%	3.9%
Under $25,000	4.8	0.0	5.9	19.7	34.6
$25,000 to $49,999	2.4	7.1	17.6	10.6	19.2
$50,000 to $74,999	4.8	7.1	11.8	15.2	3.8
$75,000 to $99,999	0.0	0.0	8.8	4.5	0.0
$100,000 to $149,999	2.4	14.3	23.6	9.1	19.2
$150,000 to $299,999	19.0	35.8	14.7	15.2	7.7
$300,000 to $499,999	19.0	7.1	2.9	10.6	7.7
$500,000 to $999,999	19.0	14.3	11.8	4.5	0.0
$1 Million Or More	28.6	14.3	2.9	1.5	3.9
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$450,000	$233,000	$112,500	$67,500	$40,000
Mean	$1,089,000	$402,900	$238,000	$146,000	$128,500
Number	42	14	34	66	26

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Nothing	15.3%	3.6%	10.2%	0.0%	6.8%
Under $25,000	30.8	10.7	40.8	21.4	21.3
$25,000 to $49,999	13.8	10.7	16.4	0.0	11.8
$50,000 to $74,999	10.8	17.9	6.1	21.4	10.7
$75,000 to $99,999	7.7	7.1	2.0	7.1	4.4
$100,000 to $149,999	7.7	10.7	8.2	7.1	10.4
$150,000 to $299,999	6.2	10.7	10.2	21.4	13.3
$300,000 to $499,999	6.2	0.0	6.1	0.0	7.7
$500,000 to $999,999	0.0	17.9	0.0	14.3	7.1
$1 Million Or More	1.5	10.7	0.0	7.1	6.5
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$31,900	$100,000	$24,400	$100,000	$73,600
Mean	$92,200	$400,800	$63,500	$285,400	$286,300
Number	65	28	49	14	338

more. However, over 31 percent said they would have to spend less than an additional $500,000 for compliance. Therefore, the distribution of estimated expenditures is bimodal, with a few colleges having to spend substantial amounts and a much larger percentage having to spend relatively little. Table V-4 displays the respondents' data. The median amount for all public college respondents was $1,895,000. The median for all private college respondents was $896,000.

TABLE V-4 Estimated Total Costs Of Achieving Compliance With The ADA, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Masters
None	0.0%	0.0%	3.6%	1.6%	0.0%
Under $500,000	13.5	0.0	14.8	25.0	33.3
$500,000 to $1,000,000	0.0	7.1	3.7	15.6	25.0
$1,000,000 to $1,999,999	0.0	7.1	25.9	17.2	25.0
$2,000,000 to $2,999,999	8.1	7.1	14.8	1.6	16.7
$3,000,000 to $5,999,999	13.5	28.6	25.9	15.6	0.0
$6,000,000 to $9,999,999	16.3	21.4	3.7	10.9	0.0
$10 Million Or More	48.6	28.6	11.2	12.5	0.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$8,500,000	$6,000,000	$2,375,000	$1,455,000	$833,000
Mean	$12,867,000	$8,795,000	$4,997,000	$3,856,000	$895,000
Number	37	14	27	64	24

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
None	7.1%	0.0%	2.1%	0.0%	2.0%
Under $500,000	37.5	17.6	60.4	18.2	29.5
$500,000 to $1,000,000	16.1	23.5	16.7	18.2	13.8
$1,000,000 to $1,999,999	23.2	5.9	8.3	0.0	14.4
$2,000,000 to $2,999,999	8.9	17.6	4.2	18.2	8.4
$3,000,000 to $5,999,999	5.4	5.9	8.3	45.4	13.1
$6,000,000 to $9,999,999	1.8	11.9	0.0	0.0	6.7
$10 Million Or More	0.0	17.6	0.0	0.0	12.1
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$667,000	$2,167,000	$897,000	$2,750,000	$1,326,000
Mean	$888,000	$4,281,000	$694,000	$2,529,000	$3,980,000
Number	56	17	48	11	298

Almost 61 percent of research universities said they would have to spend over $6 million to achieve compliance. However, only 10 percent of the remaining respondents said they would have to spend this much. Half the respondents who expected to spend over $6 million were public or private universities.

On the average, the colleges spent, in 1993–94, the equivalent of about 7.2 percent of the total remaining amount they believe they will have to spend to achieve compliance. Here are the percentages for each college type:

Public Research Universities	8.4%
Private Research Universities	4.6%
Doctoral Universities	4.8%
Public 4-Yr/Masters	3.8%
Private Masters Universities	14.4%
Private 4-Yr Colleges	10.4%
Public/Private HBCUs	9.4%
Two-Year Colleges	9.1%
Medical Colleges	11.3%
All Respondents	7.2%

Private four-year colleges and masters universities and the medical colleges respondents spent larger proportions of what ultimately is needed for ADA construction and renovation compliance. On the average, the private research universities and the doctoral universities spent less than other colleges.

Figure V-3 displays the estimated average amounts *all colleges* would have to spend in future years to achieve compliance with the Americans With Disability Act, *if the respondents were representative of the total college populations from which they were drawn.* Under 5 percent would have to spend $10 million or more. About 46 percent estimate spending under $500,000 to reach ADA compliance. Almost 83 percent of all colleges are expected to spend under $3 million to achieve compliance.

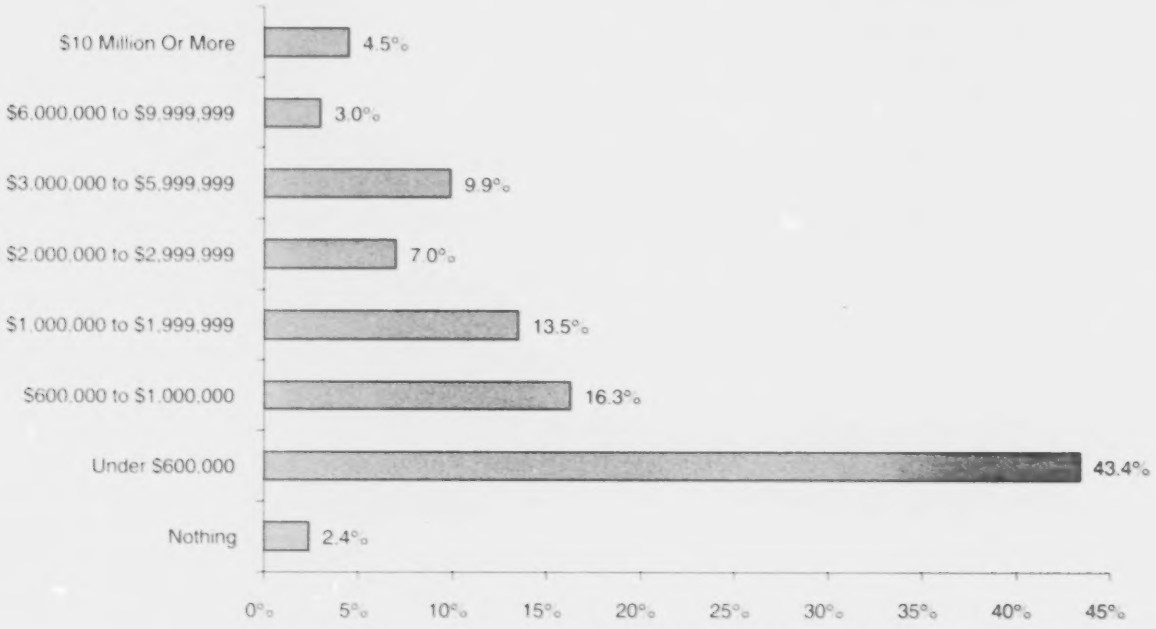
If the respondents were representative of all colleges, then all colleges would have to spend about $12 billion in total to achieve compliance with ADA. However, because the respondent colleges are larger than the non-respondent colleges, the actual aggregate amount is closer to $9 billion than to $12 billion.

Costs Per Student for ADA Compliance

The study staff examined the average per student cost of achieving compliance with ADA by responding college types. The estimated ADA amount for each responding college was divided by its number of headcount students. The average cost for the 292 responding colleges with complete data was $850, as displayed in Table V-5. However, half the colleges would have to spend less than $375 per student to meet their compliance goals. The median per student values was under $300 at public four-year and masters degree colleges, two-year colleges, and doctoral universities.

About 24 percent of all respondents, but 31 percent of research universities and medical colleges, would have to spend over $1,000 per student. So would about 31 percent of private four-year college respondents and 47 percent of HBCU respondents. The distribution of the average

Figure V-3 Estimated Average Amounts Colleges Would Have to Spend To Achieve Compliance With The ADA



per student costs to comply with ADA provisions is bimodal, just as was the distribution of total costs of compliance.

It is not be surprising that 21 percent of respondents thought it would take more than ten years for them to comply when: (1) in 1993–94, the respondent colleges spent an average of only 7 percent of the total remaining amounts they expect to spend to meet ADA compliance, (2) the average total remaining amount needed was close to $4 million, and (3) the total represented about $850 per student.

Over 46 percent of research universities and nearly 22 percent of public four-year and masters colleges said it would take them more than ten years to comply. The median years to compliance was lowest for two-year colleges with about 12 percent saying their campuses were fully accessible. This higher rate of accessibility is likely the consequence of two-year campuses being relatively new to higher education. About 5 percent of all other respondents said they were in compliance. About four out of ten respondents said they would be in compliance with the Act within four years. Within ten years, eight out of ten colleges should be complying. Figure V-4 shows the estimated number of years it will

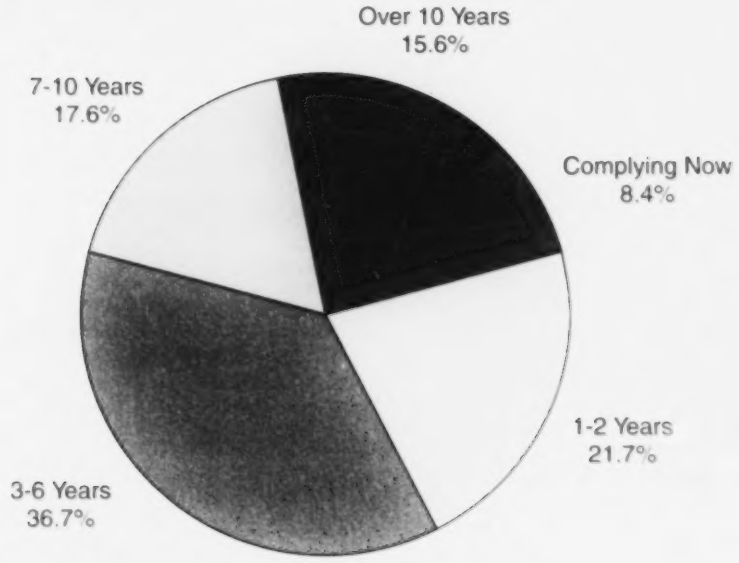
TABLE V-5 Estimated Average Per Student Costs Of Achieving Compliance With The ADA, By College Types

	Public Research	Private Research	Doctoral Universities	Public 4-YR/MA	Private Master
Under $100	13.5%	7.7%	18.5%	25.8%	25.0%
$100 to $199	8.2	15.4	11.1	17.7	16.7
$200 to $299	13.5	7.7	22.3	11.3	16.7
$300 to $499	18.9	7.7	29.6	12.9	8.2
$500 to $999	21.6	23.0	7.4	9.7	20.8
$1,000 to $1,199	5.4	15.4	3.7	3.2	4.2
$1,200 to $1,999	13.5	7.7	3.7	8.1	4.2
$2,000 Or More	5.4	15.4	3.7	11.3	4.2
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$470	$750	$290	$260	$250
Mean	$705	$1,100	$515	$720	$520
Number	37	13	27	62	24

	Private 4-Year	Pub/Priv HBCUs	2-Year Colleges	Medical Colleges	All Respondents
Under $100	20.0%	0.0%	34.8%	18.2%	21.2%
$100 to $199	16.4	5.9	10.9	0.0	13.0
$200 to $299	5.4	23.5	6.5	9.1	11.6
$300 to $499	7.3	5.9	19.6	0.0	13.7
$500 to $999	20.0	17.6	15.2	27.3	16.5
$1,000 to $1,199	16.4	0.0	0.0	0.0	5.8
$1,200 to $1,999	3.6	11.8	4.3	18.1	7.3
$2,000 Or More	10.9	35.3	8.7	27.3	10.9
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Median	$550	$675	$265	$950	$375
Mean	$920	$1,700	$650	$2,410	$850
Number	55	17	46	11	292

take all colleges to achieve compliance. Over 8 percent are complying now and about 67 percent should be complying within six years. Only 16 percent expect to take more than ten years to achieve compliance.

Figure V-4 Estimated Number of Years It Will Take Colleges To Achieve Compliance With The ADA



Summary and Conclusions

The survey showed that colleges and universities had taken important steps to achieve the goals of the Americans With Disabilities Act. Over eight out of ten completed a survey to determine compliance needs and appointed an ADA coordinator or committee. Over half had created formal plans to achieve compliance and had strategies to rank-order needs. Over four out of ten private college respondents said their colleges had completed surveys, appointed coordinators, and created formal plans to achieve compliance. Over seven out of ten public college respondents said their colleges had taken all three of these actions.

Although only 8 percent of colleges currently met compliance with ADA, just one out of ten had been identified in an ADA complaint or law suit or been subjected to a formal investigation or enforcement. Larger colleges were more likely than smaller ones to have reported such experiences.

Five percent of colleges spent $500,000 or more in 1993–94 on ADA compliance projects. Almost half spent under $50,000. American colleges in total must spend an additional estimated $9 billion in the future

to achieve compliance with the Act. However, almost half must spend under $500,000 and only 24 percent will have to spend over $2 million. About half the colleges should have to spend under $375 per student to achieve compliance. Two out of three colleges should be in compliance within the next six years with only one out of every six taking more than ten years to reach this goal.

Part VI

Study Summary and Conclusions

This report described the results of a survey of the capital renewal and deferred maintenance needs of U.S. and universities for academic year 1993–94. Almost 2,100 colleges were surveyed and 400 usable responses were received by the study staff.

The responding public and private research and doctoral universities statistically represented all such universities. The responding medical colleges were somewhat representative of all medical colleges on variables that were keys to the study. The mean enrollments of responding private masters universities, public four-year/masters universities, and historically black colleges and universities (HBCUs) were similar to those of other such colleges. But these particular respondents had greater revenues and expenditures and larger physical plants than their peer colleges. The responding public and private two-year colleges and private four-year colleges generally enrolled more students, had bigger operating budgets, and had larger physical plants than their peer colleges. Therefore, the study staff carefully considered and compensated for these biases wherever it was possible to do so.

The period of greatest growth was between 1961 and 1971, when about 26 percent of the current gross square footage (GSF) on campuses was constructed. The 1970s saw construction of another 18 percent of current GSF, and another 20 percent was constructed after 1980.

Building sizes grew in recent years, averaging 33,000 GSF since 1990. The average GSF of facilities on the respondents' campuses was 1.35 million in 1993–94. But average sizes varied dramatically, from 480,000 GSF at the two-year colleges to almost 10 million GSF at public research universities. It was estimated that the nation's colleges owned over four billion GSF of facilities space in 1993–94. About 42 percent of this footage was at public four-year colleges, masters universities, and research universities. Another 17 percent was at two-year colleges and 16 percent was at private four-year/ masters colleges.

Approximately 17 percent, or 694 million, of the four billion GSF was assigned to residential space. The next largest use of space was 476 mil-

lion GSF for offices, 425 million for laboratories, and 403 million for classrooms. There was in estimated 29 GSF of classroom space, 50 GSF of residential space, 30 GSF of laboratory space, and 15 GSF of library space for every student in 1993–94.

An estimated 23 percent of all GSF has been renovated, and about 55 percent of all GSF on college campuses has been constructed and/or renovated since 1975. But this means that about half the current GSF has not been renewed within the past 20 years. That so much space has not been renewed helps explain why accumulated deferred maintenance is substantial on many campuses.

Just under half the survey respondents were working on construction projects or renovation projects, and 31 percent were working on both. Over 25 percent were constructing laboratories or classrooms; between 20 and 23 percent were constructing special use, support, or office facilities; and between 17 percent and 19 percent were constructing library, general use, residential, or infrastructure facilities. The leading renovation categories were: classrooms, 33 percent; offices, 29 percent; laboratories, 26 percent; and residential facilities, about 24 percent.

The responding colleges' total average construction projects totaled 174,000 GSF; their average renovation projects, about 136,000 GSF. On the average, they spent $25.4 million for all construction and $12.6 million for all renovation projects. At the time of the survey, America's colleges were constructing an estimated 90 million GSF and renovating an estimated 80 million GSF. They were spending an estimated $12 billion on construction and $7 billion on renovation projects.

Slightly over half the colleges said they would soon start new construction and renovation projects, and 36 percent said they would start both. The staff best estimate of total GSF of projects to begin during 1995 and 1996 is 107 million for construction and 98 million for renovations. The colleges will likely spend $14 billion on those planned construction and $5 billion on those planned renovation projects.

State funds were the primary source of building dollars for all but the *private* four-year/masters colleges, which paid for buildings with institutional funds, private gifts, and tax-exempt bonds. State funds accounted for 45 percent of the dollars at the public four-year colleges, but only 2 percent at the private ones. On the other hand, private and foundation gifts accounted for 32 percent of the private colleges' building funds, versus just 5 percent of the public colleges' funds.

The responding colleges' top construction and renovation priorities were:

Construction	Renovation
Classrooms	Classrooms
Laboratories	Laboratories
Libraries	Residential
Special Use	

One of the more disturbing findings of the study is that 40 percent of the colleges were not addressing their top construction priorities, and about 50 percent were not addressing their top construction priorities, and they had no immediate plans to do so.

Just under half the colleges reported that their ADM amounts had increased, about one-fourth said theirs had decreased, and the remainder said theirs had stayed about the same or they were not sure how it had changed since 1988. Public research universities were the most likely to have reported increases in ADM.

The total ADM on America's campuses is an estimated $26 billion, with the largest proportion at the research and doctoral universities. These types of colleges represent only 8 percent of all campuses but they have about 38 percent of the total ADM. On the other hand, they have about 36 percent of all GSF, so their ADM is proportionate to their sizes.

The respondents' average ADM amounts represented about 11.5 percent of their annual current funds expenditures. About three out of ten colleges had ADM amounts equivalent to under 5 percent, but another three out of ten had amounts equivalent to more than 23 percent, of their current funds expenditures.

The respondents' average ADM amounts represented about 7 percent of their buildings' current replacement values. About four out of ten colleges' ADM amounts represented under 5 percent, but three out of ten colleges' amounts exceeded 11 percent, of their buildings' current replacement values.

The survey responses show that the accumulated deferred maintenance situations for all college campuses is dichotomous. At a large proportion of colleges ADM is decreasing (or not getting worse), is not huge, and it represents a relatively small percentage of their current funds expenditures and buildings replacement values. On the other hand, a similarly large proportion of colleges are experiencing *increasing* ADM and their ADM amounts represent substantial portions of their budgets and buildings replacement values. Serious ADM problems appear far from universal. The largest ADM problems are at the largest research and doctoral universities.

The typical proportion of ADM that respondents considered urgent was 23 percent. Relatively large proportions of each college type reported large amounts of urgent ADM. But similarly large proportions reported only small amounts of urgent ADM. "Urgent ADM" (situations that will get worse if left unattended exceeds an estimated $3 million on about one-fifth of all college campuses.

Over half the ADM was found in three types of campus facilities: classrooms, 19 percent; infrastructure, 18 percent; and residential, 17 percent. These three facilities types, along with laboratories, were the only types ranked either first or second in ADM amounts by all respondents.

Colleges have taken several actions to reduce ADM. Seven out of ten respondents had done strategic facilities planning to rank their ADM needs, half had made more funds available for facilities upkeep, and three out of ten earmarked portions of their budgets for ADM purposes. Larger institutions were more likely to have done facilities planning and private colleges were more likely than public colleges to have raised money for maintenance endowments for new buildings. Increasing funds for facility upkeep and raising maintenance endowments were positively related to reductions in ADM since 1988.

The respondents said several situations were particularly beneficial to dealing with ADM. They include: top college administrator priorities, support from boards of trustees or legislators, budgetary strategies targeted on ADM, and the financial health of their colleges. The last two situations were positively related to reductions in ADM since 1988.

Although some actions and situations the respondents considered positive were not statistically significantly related to reductions in total ADM amounts since 1988, they might at least have suppressed the growth in deferred maintenance.

In 1993–94, the median ADM on respondents' campuses was $7.5 million, but the median amount they spent on reducing it was only $329,000. About 25 percent of the colleges spent under $25,000 and only 14 percent spent over $3 million. Amounts spent varied considerably among college types with two-year colleges spending the least and private research universities spending the most. In terms of their total current funds expenditures, amounts spent on ADM were slight. Over two-thirds of the respondents devoted under 1 percent of their current funds expenditures to ADM projects. Only 12 percent spent 3 percent or more of their total funds.

The survey showed that colleges were taking important steps to achieve the goals of the Americans with Disabilities Act. Over eight out of ten

completed a survey to find out what was needed on their campuses and appointed an ADA coordinator or committee. About half created formal plans to achieve compliance and had strategies to rank-order needs. Approximately four out of ten private college respondents said their colleges had completed surveys, appointed coordinators, and created formal plans to achieve compliance. Over seven out of ten public college respondents said their colleges had taken all three of these actions.

Although only 8 percent of colleges met compliance with ADA at the time of the survey, only one out of ten had received in an ADA complaint or law suit or been subjected to a formal investigation or enforcement. Larger colleges were more likely than smaller ones to have reported such experiences.

Five percent of colleges spent $500,000 or more in 1993–94 on ADA compliance projects, but almost half spent under $50,000. It was estimated that American colleges in total must spend an additional $9 billion in the future to achieve compliance with the Act. However, almost half must spend under $500,000 and only 24 percent should have to spend over $2 million. About half the colleges should have to spend under $375 per student to achieve compliance.

Two out of every three colleges should meet compliance within the next six years with only one out of every six taking more than ten years to reach this goal.

The study identified research topics that warrant further attention. For example, better information is needed on why so many colleges had no immediate plans to work on their top priority construction and renovation projects, and on what effects this has on them and their students. Research is needed on what institutional and organizational factors account for differences in ADM among campuses. More information is needed on the reliability of ADM assessments, both over time and among different campuses. Research on how colleges can better develop and expand sources of financial support to meet their ADM and capital renewal needs would be helpful.

In conclusion, this research frequently found positive and negative situations on the respondents' campuses. Many colleges had substantial construction and renovations in progress or planned, but many others had no immediate plans for meeting the building priorities on their campuses. (Some colleges had construction and renovation projects in progress, but these did not seem to meet their priority needs.) Many colleges had experienced growth in their accumulated deferred maintenance since 1988, but many had not, and many others had reduced

their ADM problems since the earlier study. Many colleges had taken substantial steps toward compliance with ADA, but many others estimated it would cost them a great deal in time and money to achieve compliance. This mixture of positive and negative findings makes it difficult to generalize about the condition and needs of the nation's college facilities.

America's college facilities seem generally to be in better condition now than at the time of the 1988 study, but their needs are possibly expanding at a greater rate today. Enrollments are starting to grow again, and changes in instructional technology are working their way through the college physical plants as well as their curricula.

Appendix B

Survey Instruments

THE ASSOCIATION OF HIGHER EDUCATION FACILITIES OFFICERS/
NATIONAL ASSOCIATION OF COLLEGE AND UNIVERSITY BUSINESS OFFICERS

NATIONAL SURVEY OF CAPITAL RENEWAL
DEFERRED MAINTENANCE COSTS

SallieMae

SURVEY OBJECTIVES, GUIDELINES AND DEFINITIONS

In 1988, The Decaying American Campus: A Ticking Time Bomb estimated that the capital renewal and replacement needs of colleges and universities exceeded $60 billion. Given the financial difficulties many colleges have encountered since then, the amount has very likely grown substantially. The issues of deferred maintenance and capital renewal/replacement in higher education remain with us today as colleges face new energy and technological demands. Enhancing public and private policymaker awareness of the campus needs is the primary purpose of this attempt to update and expand on the earlier study. Because it is important that increasing attention be given these matters, the Association of Higher Education Facilities Officers (APPA), the National Association of College and University Business Officers (NACUBO) and Sallie Mae have joined forces to conduct the study.

Objectives of the Study

The objectives of this study are threefold:

1. To quantify in dollar terms the magnitude of deferred maintenance and capital renewal/replacement needs among colleges and universities in the United States;

2. To collect, analyze, and describe data that will provide a greater understanding of college and university physical plants and capital needs; and

3. To provide colleges and universities with "normative" data for use in comparing their situations to those of their peers institutions.

To achieve the study objectives, a carefully selected sample of institutions, which was designed to represent all institutions of higher education, is being surveyed to obtain information on plant characteristics and needs. The results of the survey will be published later in 1995, to be used nationwide by the colleges and members of APPA, NACUBO, and other interested associations and parties.

GUIDELINES AND DEFINITIONS FOR COMPLETING THE SURVEY

This survey seeks a variety of statistical, financial and operational data about your specific institution. We are seeking an institutional response, not a system response. It is unlikely that any one individual or department will have all of the information requested. A number of individuals and/or departments may have to collaborate in order to respond to the survey. We are grateful for your valuable help.

A difficult aspect of this survey involves defining many technical terms. There is considerable inconsistency among campuses with regard to nomenclature. Definitions of major and minor maintenance often differ from state to state and from institution to institution. Similar problems

exist in the areas of deferred maintenance, alterations and renovations, and renewal and replacement.

For the survey's purpose, wherever possible we have conformed to definitions provided in the DEFI and Class Manual (NCES, 1992). The definitions of other terms were developed jointly by APPA and NACUBO. All terms that have special definitions are printed in italics on the survey and are defined in the "HELP" keys for the pop-ups for each survey line. Please use the definitions in completing the survey.

Survey results must be returned by no later than May 15, 1995 to:

Research Department
Corporate and Investor Relations
Sallie Mae
1050 Thomas Jefferson Street, N.W.
Washington, DC 20007
Telephone: 202-298-3911

Any questions about the survey or its purposes should be directed to the Research Department staff, who will be pleased to help you. Thank you for your assistance with this important project.

GLOSSARY
DEFINITIONS OF SURVEY TERMS

Gross Area Square Footage: Is the sum of all areas on all floors of a building included within the outside faces of its exterior walls, including floor penetration areas, however insignificant, for circulation and shaft areas that connect one floor to another.

Net Assignable Square Feet (NASF): Is the sum of all areas on all floors of a building assigned to, or available for assignment to, an occupant for specific use.

Routine Maintenance: Is the systematic day-to-day process funded by the annual operating budget to prevent or control deterioration of the plant facilities; e.g., structures, systems, equipment, pavement, and grounds. It includes such things as scheduled repetitive work, such as housekeeping activities, groundskeeping, site maintenance, and certain types of service contracts; scheduled periodic work or preventative maintenance that has been planned to provide adjustments, cleaning, minor repair, and routine inspections of equipment to reduce service interruptions; and call-in requests for service.

Renewal and Replacement Maintenance: Is a systematic management process to plan and budget for known future cyclic repair and replacement requirements to extend the life of campus facilities and systems and maintain and retain usable condition of campus facilities and systems. These items are not normally contained in the annual operating budget. This includes major activities that have a maintenance cycle in excess of one year, e.g., repair roofs, paint buildings, resurface roads, equipment replacement (boilers, chillers, transformers), etc.

Unscheduled Major Maintenance: Is work which requires immediate action to restore service or resolve anticipated problems which will interrupt institutional activities. Examples include loss of electrical power, loss of water, loss of refrigeration, and building failures creating hazards to personnel or equipment.

Alteration and Renovation: Is work that is required because of a change in use of the facility or a change in program.

New Construction: Includes internal and external planning for new construction and small construction projects.

Accumulated Deferred Maintenance: Is maintenance projects from prior years and the current year that were not included in the maintenance process because of perceived lower priority status than those funded within available funding. Deferred maintenance includes postponed renewal and replacement maintenance and unperformed unscheduled major maintenance

Infrastructure: refers primarily to the spaces between the buildings of a campus and to the non-architectural elements of campus design. These elements include, but are not necessarily limited to circulation systems (roadways, walkways), utilities systems (sewers, drains, steam tunnels, electrical cabling, fiber optic lines), parking systems, campus places (natural places, recreational areas, plazas, malls), paving and hard surfaces, landscape (plants, trees, flowers, ground cover), campus furniture (benches, drinking fountains, bus shelters, partitions) way-finding and signage (entrance/exit signs, campus maps, trailblazer and directional signs, building identification), lighting, refuse and waste removal (trash receptacles, smoking urns, dumpsters) art and artifacts (sculpture, fountains, memorials and plaques), and access points for people with disabilities

Institutional Tax-Exempt Bonds: Are long- or short-term tax-exempt bonds issued by colleges, including tax-exempt commercial paper, pooled revenue bonds, variable rate demand bonds, etc.

Institutional Taxable Bonds: Are long- or short-term taxable bonds issued by colleges, including taxable commercial paper, private placement bonds, U.S. domestic public bonds, etc.

Institutional Funds: Are resources provided by the college, including funds from internal transfers, current fund accounts, and restricted funds accounts. Private gifts, grants, and donations should be reported under either Gifts or Grants From Foundations or Gifts or Grants From Private Donors.

Internal Borrowing: Is defined as resources temporarily borrowed from undesignated, unencumbered institutional funds to be paid back at a future date. This includes temporary internal transfers but excludes resources from restricted funds.

Commercial Loans: Are loans provided to the college by private banks, investors, joint ventures, and all other lenders. This EXCLUDES loans provided though internal institutional resources, federal, state, and local government resources, tax-exempt and taxable bonds, etc.

State Funds: Are resources provided though state (or municipal) appropriations and grants.

Federal Funds: Are resources provided through federal appropriations, grants and loans.

Gifts Or Grants From Foundations: Are resources provided through private foundations that do not have to be repaid.

Gifts Or Grants From Private Donors: Are resources provided by private individuals, associations, organizations, or companies.

A BACKGROUND INFORMATION

1 Name of Institution: _____

2 FICE Number: _____

3 Person coordinating Institution's survey response: _____

4 Title: _____

5 Telephone: (____)_____

B BUILDING/SPACE

1 Total number of buildings owned and maintained by the institution for E&G and/or auxiliary purposes. (Include ONLY buildings OWNED by the institution, regardless of the department responsible for their maintenance.) : _____

Numbers of buildings constructed or acquired in each time period below. Number built in each time period that have undergone *major renovations* since 1975

		Constructed	Renovated
2	Prior to and including 1950	_____	_____
3	Between 1951-1960	_____	_____
4	Between 1961-1970	_____	_____
5	Between 1971-1980	_____	_____
6	Between 1981-1990	_____	_____
7	Between 1991-1994	_____	_____

Total amount of *Gross Square Footage* of buildings constructed or acqured in each time period.
Total amount of *Gross Square Footage* that has undergone major renovations since 1975.

		Constructed	Renovated
8	Prior to and including 1950	_____	_____
9	Between 1951-1960	_____	_____
10	Between 1961-1970	_____	_____
11	Between 1971-1980	_____	_____
12	Between 1981-1990	_____	_____
13	Between 1991-1994	_____	_____

14 Total *Gross Square Footage* of campus buildings. (Include ONLY areas OWNED by the institution, regardless of the department responsible for their maintenance.): _____

15 Total *Gross Square Footage* of campus buildings leased or rented from someone else? _____

16 Total *Net Assignable Square Feet*: _____

Total *Gross Square Footage* by the following categories. Many buildings have multiple uses. Please provide square footage for each category of use across all institutional buildings. _____

17 Classroom facilities: (classrooms and classroom service): _____

18 Laboratory facilities (classroom, general, and research laboratories): _____

19 Office facilities (academic and administrative offices, conference rooms, and associated spaces): _____

20 Library/study facilities (libraries, reading/study rooms, library stacks, open-stack study rooms): _____

21 Health-care facilities (hospitals, student infirmaries, and student health centers): _____

22 Residential facilities (student and faculty housing/dormitories/ apartments): _____

23 Special Use facilities (armory, athletic or physical education, media production, clinics, and demonstration): _____

24 General Use facilities (assembly, exhibition, food facility, day care, lounge, merchandising, recreation, and meeting rooms): _____

25 Support facilities (centralized computer spaces or telecommunications, shops, central storage, vehicle storage, central service, hazardous materials): _____

26 Non-Assignable Area (circulation area, building area, mechanical area): _____

C FINANCIAL INFORMATION (in thousands of dollars)

1 Total current funds expenditures and mandatory transfers for Fiscal Year (FY) 1993-94: $_____

2 Total current funds educational and general expenditures for FY 1993-94: $_____

3 Total current fund expenditures on operations and maintenance of physical plant (excluding purchased utilities) for FY 1993-94: $_____

4 Total physical plant assets at the end of FY 1993-94 (book value)*: $_____

5 Total plant fund building assets at the end of FY 1993-94 (book value): $_____

6 Total replacement value of building assets at the end of FY 1993-94: $_____

* Physical plant assets include land, buildings, and equipment owned, rented, or used by the institution. Do NOT include those plant values which are part of endowment or other capital fund investments in real estate.

D PHYSICAL PLANT FUNDING REQUIREMENTS (in thousands of dollars)

		Actual Expenditures 1993-94	Budgeted 1994-95
1	Expenditures on *routine maintenance*	$_____	$_____
2	Expenditures on *renewal and replacement maintenance*	$_____	$_____
3	Expenditures on *unscheduled major maintenance*	$_____	$_____

Expenditures on *capital additions and improvements* which include the following:

4	Alteration and Renovation (Work that is required because of a change in use of the facility or a program change)	$_____	$_____
5	New Construction (Includes internal and external planning for new construction as well as small construction projects)	$_____	$_____
6	Expenditures on *accumulated deferred maintenance*	$_____	$_____
7	Total amount of *accumulated deferred maintenance* at the end of FY 1993-94:	$_____	
8	Approximately what percent of *accumulated deferred maintenance* in 7 above do you consider urgent?		_____%
9	What dollar amount of the *accumulated deferred maintenance* amount identified in Question 7 is attributable to Education and General Facilities		$_____
10	What dollar amount is attributable to Auxiliary Facilities?		$_____

11 How has your institution's *accumulated deferred maintenance* backlog changed since 1988? (Please check one.)

_____It has increased. ____It has remained about the same. ____It has decreased.

Check each item below that you consider was beneficial and or detrimental to your institution's dealing with *accumulated deferred maintenance*?

	Beneficial	Detrimental	
12	_____	_____	Priorities of top administrators
13	_____	_____	Support of trustees and/or legislators
14	_____	_____	Budgetary and/or financial strategies
15	_____	_____	State appropriations
16	_____	_____	Financial condition of the institution

Which of the following steps has your institution taken to address its *accumulated deferred maintenance* need? (Check all that apply.)

17 _____ Made more funds available for facility upkeep.

18 _____ Earmarked a certain amount in budget for deferred maintenance

19 _____ Undertook strategic facilities planning to prioritize needs

20 _____ Delayed or cancelled new construction

21 _____ Raised funds for maintenance endowments for new buildings

22 _____ Other (Please specify):_____

23 _____ Other (Please specify):_____

On a percentage basis, what is the approximate distribution of the *accumulated deferred maintenance* dollar backlog (from Question 7 above) within the following categories:

24 Classroom facilities: _____%

25 Laboratory facilities: _____%

26 Office facilities: _____%

27 Library/study facilities: _____%

28 Health-care facilities: _____%

29 Residential facilities: _____%

30 Special use facilities: _____%

31 General use facilities: _____%

32 Support facilities: _____%

33 Infrastructure: _____%

34 Non-Assignable areas: _____%

Total 100 %

35 What is the total amount of funding necessary to totally eliminate your *accumulated deferred maintenance* by the end of FY 1994-95? _____

36 Do you conduct periodic facilities audits to determine deferred maintenance funding requirements?

NO (Skip to Section E) _____

YES, by Formula _____

YES, by Walk-Through _____

YES, by Combination of Formula and Walk-Through _____

37 If you conduct periodic audits, how often are they done?

Annually _____

Biannually _____

Every 3 years _____

Every 4 years _____

Every 5 or more years _____

E CONSTRUCTION/RENOVATION IN PROGRESS

What new construction or renovation projects **are in progress?** ("N" = new construction and "R" = renovation.) (If no projects are in progress, skip to Section F.)

		Type	Approx Gross Square Feet (1,000s)	Year of Completion	Estimated Cost ($000's)
1	Classroom facilities	N	_____	_____	$_____
2		R	_____	_____	$_____
3	Laboratory facilities	N	_____	_____	$_____
4		R	_____	_____	$_____
5	Office facilities	N	_____	_____	$_____
6		R	_____	_____	$_____
7	Library/study facilities	N	_____	_____	$_____
8		R	_____	_____	$_____
9	Health-care facilities	N	_____	_____	$_____
10		R	_____	_____	$_____
11	Residential facilities	N	_____	_____	$_____
12		R	_____	_____	$_____
13	Special Use facilities	N	_____	_____	$_____
14		R	_____	_____	$_____
15	General Use facilities	N	_____	_____	$_____
16		R	_____	_____	$_____
17	Support facilities	N	_____	_____	$_____
18		R	_____	_____	$_____

19	Infrastructure	N	_____	_____	$_____
20		R	_____	_____	$_____
21	Non-Assignable areas	N	_____	_____	$_____
22		R	_____	_____	$_____

Approximately what percentage of the total funds for all the construction and renovation projects in progress come from each of the following sources?

23	Institutional Tax-Exempt Bonds	_____%
24	Institutional Taxable Bonds	_____%
25	Institutional Funds	_____%
26	Commercial Loans	_____%
27	Internal Borrowing	_____%
28	Tax-Exempt Leases and Certificates of Participation	_____%
29	State Funds	_____%
30	Federal Funds	_____%
31	Gifts or Grants From Private Donors	_____%
32	Gifts or Grants From Foundations	_____%
33	Other Sources (please specify below)	
	_____	_____%
	Total From All Sources	100 %

F PLANNED CONSTRUCTION/RENOVATION What new construction or renovation projects do you **plan to start in 1995-96 and 1996-97?** ("N" = new construction and "R" =renovation. (If you have no plans for projects in the next two years, please skip to Section G.)

		Type	Approx Gross Square Feet (1,000s)	Year of Completion	Estimated Cost ($000s)
1	Classroom facilities	N	_____	_____	$_____
2		R	_____	_____	$_____
3	Laboratory facilities	N	_____	_____	$_____
4		R	_____	_____	$_____
5	Office facilities	N	_____	_____	$_____
6		R	_____	_____	$_____
7	Library/Study facilities	N	_____	_____	$_____
8		R	_____	_____	$_____
9	Health-care facilities	N	_____	_____	$_____
10		R	_____	_____	$_____
11	Residential facilities	N	_____	_____	$_____
12		R	_____	_____	$_____
13	Special Use facilities	N	_____	_____	$_____
14		R	_____	_____	$_____
15	General Use facilities	N	_____	_____	$_____
16		R	_____	_____	$_____
17	Support facilities	N	_____	_____	$_____
18		R	_____	_____	$_____

19	Infrastructure	N	_____	_____	$_____
20		R	_____	_____	$_____
21	Non-Assignable areas	N	_____	_____	$_____
22		R	_____	_____	$_____

Approximately what percentage of total funds for all the construction and renovation projects you plan to begin in 1995-96 or 1996-97 will come from each of the following sources?

23	Institutional Tax-Exempt Bonds	_____%
24	Institutional Taxable Bonds	_____%
25	Institutional Funds	_____%
26	Commercial Loans	_____%
27	Internal Borrowing	_____%
28	Tax-Exempt Leases and Certificates of Participation	_____%
29	State Funds	_____%
30	Federal Funds	_____%
31	Gifts or Grants From Private Donors	_____%
32	Gifts or Grants From Foundations	_____%
33	Other Sources (please specify below)	
	_____	_____%
	Total From All Sources	100 %

G CONSTRUCTION/RENOVATION PRIORITIES

Regardless of whether your institution is working on them, is planning to do so during the next two years, or has only unapproved and unfunded projects in mind, what category of construction and renovation project is the MOST IMPORTANT to your institution? We have listed the categories below. Please look at the list and write the number of the single most important category for construction and renovation in the spaces provided below..

1 Number for Top Construction Priority _____
2 Number for Top Renovation Priority _____

1--Classroom facilities	2--Laboratory facilities	3---Office facilities
4--Library /Study facilities	5--Health-care facilities	6--Residential facilities
7--Special Use facilities	8--General use facilities	9--Support facilities
10--Infrastructure	11--Non-Assignable Areas	

H CAMPUS RESPONSE TO ADA

We recognize that campuses have had to respond in many ways to passage of the Americans with Disabilities Act (ADA). The questions in this section will help us better understand your situation.

1 How much did your institution spend during FY 1993-94 on alterations to your campus to comply with the ADA? (Dollar Amounts in $1,000s) $_____

2 Work to address *accumulated deferred maintenance* and capital renewal needs is often included with projects undertaken to meet ADA accessibility requirements. What percentage of the expenditures reported in Question H-1 were used to meet deferred maintenance and capital renewal needs? _____%

3 What is the estimated cost of bringing your campus facilities into compliance with the ADA? (Dollar Amounts in $1,000s) $_____

4 How long is it likely to take your institution to achieve substantial compliance with ADA? (Please check one response)

_____ The campus is fully accessible now
_____ 1 to 2 years _____ 3 to 4 years
_____ 5 to 6 years _____ 7 to 8 years
_____ 9 to 10 years _____ More than 10 years

In the past two years, which of the following actions has your institution taken with regard to compliance with the ADA? (Please check all that apply)

5 _____ Completed a survey to determine modifications necessary to comply with ADA

6 _____ Appointed an ADA coordinator and/or committee

7 _____ Agreed on a strategy for prioritizing compliance needs

8 _____ Prepared a formal plan to comply with ADA

9 _____ Developed a long-range funding plan

10 _____ Identified sources of funds to support ADA modifications

Has your institution been:

11 _____ Subjected to an ADA investigation or enforcement action by a federal or state agency?

12 _____ Named in a complaint or suit filed by a student, employee, or member of the public alleging failure to comply with ADA?

Thank you for your assistance in completing this survey!

PROTOCOL FOR PHONE CALLS TO CRDM SURVEY RECIPIENTS

INTRODUCTION:

Hello, my name is _____ I'm calling from Sallie Mae's Corporate and Investor Relations Research Department. Do you have a few minutes to talk to me now, or would it be more convenient to call back later? [If "later," get a confirmed time and date.] You may have heard that APPA and Sallie Mae are surveying colleges and universities to determine their accumulated deferred maintenance and capital renewal needs.

Do you recall hearing about that survey? [Acknowledge whatever you are told.]

Asking recipients whether they have heard about the survey is to get into communication with them and give them some reality on who we are and what we are doing. If they don't know about the survey or its purpose, tell them that it is being conducted by Sallie Mae for APPA and NACUBO. Its purpose is to assess college maintenance, construction, and renovation activities and needs. We are updating **The Decaying College Campus**, the 1988 APPA study which documented college needs in these areas.

Read the purposes of the study on the paper version of the survey before making calls so that you can respond to other questions the contacts might have. Here we want to show the contacts how important this survey is. But take as little time as possible on it, because we want to get our questions answered.

Tell the contacts that, so far, about 300 colleges have returned the written surveys. We are pleased with those responses, but are concerned that we have too few responses to draw meaningful conclusions about certain sub-groups of colleges. Therefore, we decided to call some colleges to see if they could answer just a few questions for us over the phone.

Tell them: "We think you can answer the questions without referring to your files and notes. Do you have a few minutes now to answer our questions?"

If the contacts say "yes," then ask the questions. If they don't have time now, ask if they would prefer you call back some other time (get an exact date and time) or if there someone else assistant who can answer the questions now. Be persuasive. We don't want to lose their responses. If the contacts are willing to answer the survey now, a "thank you" for assistance is appropriate. Being polite is always appropriate.

THE SURVEY: Tell them: "Now to the survey. Our first questions concerns accumulated deferred maintenance or ADM. By ADM, we mean maintenance projects from current and prior years that were not included in the maintenance process because of perceived lower priority status than those maintenance projects funded within available funding resources."

(1) We want to know how your institution's ADM has changed since 1988? Has it
(Check One) INCREASED?_____
DECREASED?_____
STAYED ABOUT THE SAME?_____

(2) Please give me your best estimate of the total amount of your campus's ADM by the end of academic year 1994-95?

$_____ [If the contact is not sure, ask for a range of responses.]

(3) Do you conduct periodic facilities audits to determine ADM funding requirements?

NO _____ (Skip to Question 6)
YES _____ by formula
YES _____ by walk-through
YES _____ by a combination of formula and walkthrough

(4) How often do your conduct these audits?

_____ (YEARS/MONTHS/WEEKS/WHATEVER)

We want to know if your college might have taken certain actions to address its ADM needs? [Write "y" if Yes; "n" if No.]

HAS YOUR COLLEGE:

(5) _____ Made more funds available for facilities upkeep?

(6) _____ Earmarked a certain budget amount for ADM?

(7) _____ Undertook strategic facilities planning to prioritize its maintenance needs?

(8) _____ Delayed or cancelled new construction?

(9) _____ Raised funds for maintenance endowments for new buildings?

(10) Is there anything else that your college might have done to address its deferred maintenance needs? If "yes", write responses in here: _____

CONSTRUCTION AND RENOVATION: Now tell them: "This takes care of our questions on deferred maintenance. Now we have some questions on construction and renovation." Then continue:

(11) Are there any new construction projects currently in progress on your campus?

_____YES _____NO (skip to question 13)

(12) What kinds of facilities are being constructed? [Write whatever contact tells you]

_____

_____

(13) Are there any new renovations projects in progress on your campus?

_____YES _____NO (skip to question 15)

(14) What kinds of facilities are being renovated? [Write whatever contact tells you]

_____

_____

(15) Regardless of whether your institution is working on them, is planning to do so, or only has unapproved and unfunded projects in mind, we want to know what construction and renovation priorities are most important. Can you tell me what the single most important *construction priority* is on your campus?

WRITE ANSWER HERE:_____

Next, tell them something like, "We need to classify that building by its category. What would you say it is? [Don't ask this question if the answer is obvious. If not, ask, "Is it a [something from the list below]?"

[Mark whatever ONE is selected. Prompt the contact if you have to get an answer.]

_____ Classroom facilities	____ Laboratory facilities
_____ Office facilities	____ Library/study facilities
_____ Health Care facilities	____ Special Use facilities*
_____ General Use facilities*	____ Support facilities*
_____ Infrastructure	____ Unknown

(16) Now, please tell me what your campus's single most important *renovation priority* currently is.

WRITE ANSWER HERE:_____ [Just as with the Construction priority question, get the, answer to this one classified by building category. "What kind of building would you say it is?" [Again, don't ask this question if the answer is obvious. If not,ask, "Is it a [something from the list below]?"

[Mark whatever ONE is selected. Prompt the contact if you have to for an answer.]

_____Classroom facilities	____ Laboratory facilities
_____Office facilities	____ Library/study facilities
_____Health Care facilities	____ Special Use facilities*
_____General Use facilities*	____ Support facilities*
_____Infrastructure	____ Unknown

ADA Questions: Our NACUBO partner in this survey project wants to know something about college expenditures on construction and renovation to comply with the Americans With Disabilities Act (ADA).

(17) Is your college in substantial compliance with the ADA now?

_____YES (skip to Question 20)

_____NO

(18) How long is it likely to take your college to achieve substantial compliance with ADA?

WRITE RESPONSE HERE:_____ (Years/Months/Weeks/etc)

(19) What is the estimated cost of bringing your campus facilities into compliance with the ADA?

WRITE RESPONSE HERE:$_____

(20) About how much did your institution spend in 1994-95 on alterations to your campus to comply with the ADA?

WRITE RESPONSE HERE:_____

Finale: "Thank you very much for your answers and assistance. As a thank you to those who helped us, we will send them an Executive Summary of the study report and some reference data to compare your college with other similar colleges. Let me get your name, title, and address so that we can be sure to send you these materials."

NAME:_____

TITLE:_____

COLLEGE NAME:_____

COLLEGE ADDRESS:_____

_____

Thank them again for their assistance and then sign off.

Appendix C

Survey Respondents

Listing by Institution Type

Public Research

University of Arkansas-Fayetteville	AR
Arizona State University	AZ
University of California-Berkeley	CA
University of California-Los Angeles*	CA
University of California-San Diego	CA
University of California-Santa Cruz	CA
Colorado State University	CO
University of Colorado at Boulder	CO
University of Connecticut	CT
University of Delaware	DE
Florida State University	FL
University of Florida	FL
University of South Florida	FL
University of Georgia	GA
Iowa State University	IA
University of Iowa*	IA
Southern Illinois Univ. at Carbondale	IL
University of Illinois Urbana/Champaign	IL
Purdue University Main Campus	IN
Kansas State University of Agriculture and Ap	KS
Michigan State University	MI
University of Michigan-Ann Arbor	MI
Wayne State University	MI
University of Minnesota-Twin Cities	MN
University of Missouri-Columbia*	MO
University of North Carolina at Chapel Hill	NC
University of Nebraska at Lincoln	NE
New Mexico State University Main Campus*	NM
University of New Mexico-Main Campus	NM
Suny at Stony Brook	NY
Kent State University Main Campus	OH
Ohio State University-Main Campus	OH
Oklahoma State University Main Campus	OK
University of Oklahoma Norman Campus	OK
Oregon State University	OR
Univ. of Pittsburgh-Pittsburgh Campus	PA
Clemson University*	SC
University of South Carolina-Columbia	SC
University of Tennessee-Knoxville*	TN
Utah State University	UT
University of Utah	UT
University of Virginia	VA
Virginia Polytechnic Institute and State Univ	VA
Virginia Commonwealth University	VA
University of Washington	WA
Washington State University	WA
University of Wisonsin-Madison	WI
University of Wisconsin-Milwaukee	WI
West Virginia University	WV
University of Wyoming	WY

Private Research

California Institute of Technology*	CA
Stanford University*	CA
Yale University	CT

*Telephone survey respondents.

Georgetown University	DC
The George Washington University	DC
University of Miami	FL
Tulane University of Louisiana	LA
Brandeis University*	MA
Harvard University	MA
Tufts University	MA
Duke University	NC
Cornell University-Endowed Colleges	NY
Rockefeller University	NY
Syracuse University Main Campus	NY
University of Rochester*	NY
Case Western Reserve University*	OH
Carnegie Mellon University*	PA
Lehigh University	PA
Vanderbilt University	TN
Rice University	TX
Brigham Young University	UT

Doctoral Universities

The University of Alabama	AL
Pepperdine University*	CA
San Diego State University*	CA
University of Laverne*	CA
University of Northern Colorado	CO
American University*	DC
Florida Atlantic University*	FL
Florida International University	FL
Illinois State University	IL
Indiana State University	IN
Wichita State University	KS
University of Maryland Baltimore County Campus*	MD
Michigan Technological University	MI
Western Michigan University	MI
University of Missouri-Rolla	MO
University of Southern Mississippi	MS
Montana State University	MT
University of Montana	MT
University of North Carolina at Greensboro*	NC
Wake Forest University	NC
University of North Dakota Main Campus	ND
Dartmouth College*	NH
University of New Hampshire-Main Campus*	NH
Stevens Institute of Technology*	NJ
University of Nevada-Reno	NV
Clarkson University	NY
Bowling Green State University Main Campus*	OH
Miami University Oxford Campus	OH
The Union Institute	OH
University of Akron Main Campus*	OH
University of Tulsa*	OK
Uniersity of South Dakota	SD
Memphis State University	TN
East Texas State University	TX
Texas Christian University	TX
Texas Womans University	TX
University of North Texas	TX
College of William and Mary	VA

Public Four-Year/Masters

Jacksonville State University	AL
University of Montevallo	AL
Arkansas Tech University*	AR
University of Arkansas at Little Rock	AR
University of Çentral Arkansas	AR
California State Univ., San Bernardino	CA
California State University, Sacramento	CA
California State University-Hayward	CA
Adams State College	CO
The University of West Florida	FL
Augusta College	GA
Georgia Southern University	GA
Georgia Southwestern College	GA
Georgia College	GA
University of Northern Iowa	IA
Eastern Illinois University	IL
Northeastern Illinois University	IL
Sangamon State University	IL
Emporia State University	KS
Pittsburg State University	KS
Washburn University of Topeka	KS
Louisiana State University Shreveport	LA
Louisiana State University	LA
Northeast Louisiana University	LA
University of Massachusetts-Boston	MA
Saint Mary College of Maryland	MD
University of Baltimore	MD
University of Maine at Farmington	ME
University of Southern Maine	ME
Central Michigan University	MI
Eastern Michigan University	MI
Oakland University	MI
Bemidji State University	MN
Saint Cloud State University	MN
University of Minnesota Morris*	MN
Northwest Missouri State University	MO
Southwest Missouri State University	MO
Delta State University	MS
Western Montana College University of Montana*	MT
University of North Carolina at Wilmington	NC
University of Nebraska at Kearney	NE
Wayne State College	NE

*Telephone survey respondents.

Rutgers the State University Central Office	NJ
William Paterson College	NJ
Suny College at Brockport	NY
Suny College at Buffalo	NY
Southwestern Oklahoma State University	OK
University of Science and Arts of Oklahoma	OK
East Stroudsburg University of Pennsylvania	PA
Pennsylvania State University	PA
Slippery Rock University of Pennsylvania	PA
University of Pittsburgh Johnstown Campus*	PA
Francis Marion University	SC
The Citadel	SC
University of South Carolina at Aiken	SC
University of South Carolina at Spartanburg	SC
Black Hills State University	SD
Tennessee Technological University	TN
Southwest Texas State University	TX
Sam Houston State University	TX
Tarleton State University	TX
Texas A & I University	TX
Texas A & M University-Corpus Christi	TX
University of Houston-Clear Lake	TX
University of Texas at El Paso	TX
University of Texas-Pan American	TX
Weber State University	UT
James Madison University	VA
Mary Washington College	VA
University of Wisconsin-Green Bay	WI
University of Wisconsin-Platteville	WI
University of Wisconsin-Superior	WI
University of Wisconsin-Whitewater*	WI
Marshall University	WV

Private Masters

Azusa Pacific University	CA
California Lutheran University*	CA
College of Notre Dame	CA
Fresno Pacific College	CA
Loyola Marymount University	CA
Fairfield University	CT
Rollins College	FL
Saint Thomas University	FL
Drake University	IA
Illinois Benedictine College*	IL
Saint Xavier University	IL
Butler University	IN
Mount Saint Mary College*	MD
Aquinas College	MI
College of Saint Catherine	MN
Maryville University of Saint Louis*	MO
Park College	MO
Meredith College*	NC
College of Saint Rose	NY
Rochester Institute of Technology	NY
Xavier University	OH
Beaver College	PA
College Misericordia	PA
La Salle University	PA
Villanova University	PA
Widener University Pennsylvania Campus	PA
Our Lady of the Lake University	TX
Saint Marys University	TX
University of Central Texas	TX
Norwich University	VT
Seattle Pacific University	WA
Seattle University	WA
Wheeling Jesuit College*	WV

Private Four-Year

Faulkner University*	AL
Pomona College	CA
Southern California College	CA
The National Hispanic University	CA
Albertus Magnus College	CT
Wesleyan University	CT
Saint Leo College	FL
Agnes Scott College	GA
Covenant College	GA
Iowa Wesleyan College*	IA
Morningside College	IA
Augustana College	IL
Trinity Christian College	IL
Wheaton College	IL
Earlham College	IN
Huntington College	IN
Saint Mary College	KS
Centre College	KY
Georgetown College	KY
Thomas More College	KY
Transylvania University*	KY
College of the Holy Cross	MA
Mount Ida College	MA
Pine Manor College	MA
Smith College	MA
Wellesley College	MA
Williams College	MA
St Johns College	MD
Washington College	MD
Adrian College	MI
Albion College	MI
Concordia College	MI
Gustavus Adolphus College*	MN
Macalester College	MN
Culver-Stockton College	MO

*Telephone survey respondents.

Hannibal-Lagrange College*	MO
Stephens College	MO
Blue Mountain College	MS
Millsaps College	MS
Greensboro College	NC
Drew University	NJ
Colgate University	NY
Hilbert College	NY
Hobart William Smith Colleges	NY
Regents College, University of the State of N	NY
Kenyon College	OH
Oberlin College	OH
Lewis And Clark College	OR
Allegheny College	PA
Bucknell University	PA
Delaware Valley College of Science and Agricu*	PA
Haverford College	PA
Holy Family College	PA
Lebanon Valley College	PA
Moravian College	PA
Wilson College	PA
Inter American University of PR-Aguadilla	PR
Roger Williams University	RI
Coker College	SC
Furman University	SC
Carson-newman College	TN
David Lipscomb University	TN
Maryville College*	TN
Southern College of Seventh-Day Adventists	TN
Concordia Lutheran College	TX
Lubbock Christian University	TX
University of Dallas	TX
Randolph-Macon College	VA
Burlington College	VT
Green Mountain College	VT
Whitman College	WA
Lawrence University	WI
Wisconsin Lutheran College	WI

Public/Private HBCU

Alabama A&M University*	AL
Alabama State University*	AL
Miles College*	AL
Stillman College*	AL
Talladega College*	AL
Tuskegee University	AL
Shorter College*	AR
Howard University*	DC
University of the District of Columbia*	DC
Delaware State College*	DE
Bethune Cookman College*	FL
Florida Agricultural and Mechanical University*	FL
Albany State College	GA
Morehouse College*	GA
Savannah State College*	GA
Dillard University*	LA
Southern University and A & M Col at Baton Ro*	LA
Southern University Shreveport-Bossier City C*	LA
Bowie State University	MD
Morgan State University	MD
University of Maryland Eastern Shore*	MD
Lincoln University*	MO
Alcorn State University*	MS
Coahoma Community College*	MS
Mary Holmes College*	MS
Mississippi Valley State University*	MS
Nc Agricultural & Technical State Univ.	NC
Saint Augustines College*	NC
Shaw University	NC
Winston-Salem State University*	NC
Langston University*	OK
Cheyney University of Pennsylvania*	PA
Fisk University*	TN
Meharry Medical College	TN
Tennessee State University*	TN
Virginia State University	VA

Two-Year/Tribal

Navajo Community College*	AZ
Yosemite Community College District Office	CA
Miami-Dade Community College	FL
Gwinnett Technical Institute	GA
Iowa Valley Community College	IA
College of Du Page	IL
Highland Community College*	IL
Maccormac College	IL
Oakton Community College	IL
Central College*	KS
Independence Community College*	KS
Johnson County Community College	KS
Catonsville Community College	MD
Maryland College of Art and Design	MD
Prince Georges Community College	MD
Alpena Community College*	MI
Gogebic Community College*	MI
Lake Michigan College*	MI
Muskegn Community College	MI
Cottey College	MO
Crowder College	MO
Flathead Valley Community College	MT
Alamance Community College	NC
Richmond Community College	NC
Vance-granville Community College	NC

*Telephone survey respondents.

Fort Berthold Community College*	ND
York College*	NE
Truckee Meadows Community College	NV
Monroe Community College	NY
Suffolk County Community College Ammerman Cam	NY
Suny College of Technology at Canton*	NY
Carl Albert State College	OK
Harrisburg Area Community College-Harrisburg	PA
Mount Aloysius College	PA
Valley Forge Military College	PA
Midlands Technical College	SC
Technical College of The Lowcountry	SC
Presentation College	SD
Martin Methodist College	TN
Alamo Community College District	TX
Brazosport College	TX
Brookhaven	TX
Cedar Valley College	TX
Eastfield College	TX
El Centro College	TX
El Paso Community College	TX
Mountain View College	TX
North Lake College	TX
Richland College	TX
Texas State Technical College-Sweetwater Camp	TX
Danville Community College	VA
Landmark College	VT
Sterling College	VT
Centralia College	WA
Renton Technical College	WA
Tacoma Community College	WA
Waukesha County Technical College	WI

Medical

University of Colorado Health Sciences Center	CO
The University of Connecticut Sch of Med & De	CT
Medical College of Georgia	GA
Rush University*	IL
Louisiana State University Medical Center*	LA
University of Maryland Baltimore Professional	MD
University of Mississippi Medical Center*	MS
University of Nebraska Medical Center	NE
Mount Sinai School of Medicine	NY
Suny Health Science Center at Syracuse*	NY
Medical College of Ohio*	OH
University of Oklahoma Health Sciences Center	OK
Pennsylvania State Univ Milton Hershey Medl C*	PA
Philadelphia College of Pharmacy/Science	PA
Medical University of South Carolina	SC
University of Texas Medical Branch at Galvest	TX
University of Texas Southwestern Med Ctr Dall	TX
Medical College of Wisconsin	WI

Alphabetic Listing

Adams State College	CO
Adrian College	MI
Agnes Scott College	GA
Alabama A&M University*	AL
Alabama State University*	AL
Alamance Community College	NC
Alamo Community College District	TX
Albany State College	GA
Albertus Magnus College	CT
Albion College	MI
Alcorn State University*	MS
Allegheny College	PA
Alpena Community College*	MI
American University*	DC
Aquinas College	MI
Arizona State University	AZ
Arkansas Tech University*	AR
Augusta College	GA
Augustana College	IL
Azusa Pacific University	CA
Beaver College	PA
Bemidji State University	MN
Bethune Cookman College*	FL
Black Hills State University	SD
Blue Mountain College	MS
Bowie State University	MD
Bowling Green State University Main Campus*	OH
Brandeis University*	MA
Brazosport College	TX
Brigham Young University	UT
Brookhaven	TX
Bucknell University	PA
Burlington College	VT
Butler University	IN
California Institute of Technology*	CA
California Lutheran University*	CA
California State University-Hayward	CA
California State University, Sacramento	CA
California State Univ., San Bernardino	CA
Carl Albert State College	OK

*Telephone survey respondents.

Carnegie Mellon University*	PA
Carson-Newman College	TN
Case Western Reserve University*	OH
Catonsville Community College	MD
Cedar Valley College	TX
Central College*	KS
Central Michigan University	MI
Centralia College	WA
Centre College	KY
Cheyney University of Pennsylvania*	PA
The Citadel	SC
Clarkson University	NY
Clemson University*	SC
Coahoma Community College*	MS
Coker College	SC
Colgate University	NY
College of Du Page	IL
College of the Holy Cross	MA
College Misericordia	PA
College of Notre Dame	CA
College of Saint Catherine	MN
College of Saint Rose	NY
College of William and Mary	VA
Colorado State University	CO
Concordia College	MI
Concordia Lutheran College	TX
Cornell University-Endowed Colleges	NY
Cottey College	MO
Covenant College	GA
Crowder College	MO
Culver-stockton College	MO
Danville Community College	VA
Dartmouth College*	NH
David Lipscomb University	TN
Delaware State College*	DE
Delaware Valley College of Science and Agricu*	PA
Delta State University	MS
Dillard University*	LA
Drake University	IA
Drew University	NJ
Duke University	NC
Earlham College	IN
East Stroudsburg University of Pennsylvania	PA
East Texas State University	TX
Eastern Illinois University	IL
Eastern Michigan University	MI
Eastfield College	TX
El Paso Community College	TX
El Centro College	TX
Emporia State University	KS
Fairfield University	CT
Faulkner University*	AL
Fisk University*	TN
Flathead Valley Community College	MT
Florida Agricultural and Mechanical University*	FL
Florida Atlantic University*	FL
Florida International University	FL
Florida State University	FL
Fort Berthold Community College*	ND
Francis Marion University	SC
Fresno Pacific College	CA
Furman University	SC
The George Washington University	DC
Georgetown College	KY
Georgetown University	DC
Georgia College	G
Georgia Southern University	GA
Georgia Southwestern College	GA
Gogebic Community College*	MI
Green Mountain College	VT
Greensboro College	NC
Gustavus Adolphus College*	MN
Gwinnett Technical Institute	GA
Hannibal-Lagrange College*	MO
Harrisburg Area Community College-Harrisburg	PA
Harvard University	MA
Haverford College	PA
Highland Community College*	IL
Hilbert College	NY
Hobart William Smith Colleges	NY
Holy Family College	PA
Howard University*	DC
Huntington College	IN
Illinois Benedictine College*	IL
Illinois State University	IL
Independence Community College*	KS
Indiana State University	IN
Inter American University of PR-Aguadilla	PR
Iowa State University	IA
Iowa Valley Community College	IA
Iowa Wesleyan College*	IA
Jacksonville State University	AL
James Madison University	VA
Johnson County Community College	KS
Kansas State University of Agriculture and Ap	KS
Kent State University Main Campus	OH
Kenyon College	OH
La Salle University	PA
Lake Michigan College*	MI
Landmark College	VT
Langston University*	OK
Lawrence University	WI
Lebanon Valley College	PA

*Telephone survey respondents.

Lehigh University	PA
Lewis and Clark College	OR
Lincoln University*	MO
Louisiana State University Medical Center*	LA
Louisiana State University	LA
Louisiana State University Shreveport	LA
Loyola Marymount University	CA
Lubbock Christian University	TX
Macalester College	MN
Maccormac College	IL
Marshall University	WV
Martin Methodist College	TN
Mary Holmes College*	MS
Mary Washington College	VA
Maryland College of Art and Design	MD
Maryville University of Saint Louis*	MO
Maryville College*	TN
Medical College of Georgia	GA
Medical College of Ohio*	OH
Medical College of Wisconsin	WI
Medical University of South Carolina	SC
Meharry Medical College	TN
Memphis State University	TN
Meredith College*	NC
Miami-Dade Community College	FL
Miami University Oxford Campus	OH
Michigan State University	MI
Michigan Technological University	MI
Midlands Technical College	SC
Miles College*	AL
Millsaps College	MS
Mississippi Valley State University*	MS
Monroe Community College	NY
Montana State University	MT
Moravian College	PA
Morehouse College*	GA
Morgan State University	MD
Morningside College	IA
Mont Aloysius College	PA
Mount Ida College	MA
Mount Saint Mary College*	MD
Mount Sinai School of Medicine	NY
Mountain View College	TX
Muskegon Community College	MI
The National Hispanic University	CA
Navajo Community College*	AZ
Nc Agricultural & Technical State Univ.	NC
New Mexico State University Main Campus*	NM
North Lake College	TX
Northeast Louisiana University	LA
Northeastern Illinois University	IL
Northwest Missouri State University	MO
Norwich University	VT
Oakland University	MI
Oakton Community College	IL
Oberlin College	OH
Ohio State University-Main Campus	OH
Oklahoma State University Main Campus	OK
Oregon State University	OR
Our Lady of the Lake University	TX
Park College	MO
Pennsylvania State University	PA
Pennsylvania State Univ Milton Hershey Medl C*	PA
Pepperdine University*	CA
Philadelphia College of Pharmacy/Science	PA
Pine Manor College	MA
Pittsburg State University	KS
Pomona College	CA
Presentation College	SD
Prince Georges Community College	MD
Purdue University Main Campus	IN
Randolph-Macon College	VA
Regents College, University of the State of N	NY
Renton Technical College	WA
Rice University	TX
Richland College	TX
Richmond Community College	NC
Rochester Institute of Technology	NY
Rockefeller University	NY
Roger Williams University	RI
Rollins College	FL
Rush University*	IL
Rutgers the State University Central Office	NJ
Saint Augustines College*	NC
Saint Cloud State University	MN
Saint Leo College	FL
Saint Mary College	KS
Saint Mary College of Maryland	MD
Saint Marys University	TX
Saint Thomas University	FL
Saint Xavier University	IL
Sam Houston State University	TX
San Diego State University*	CA
Sangamon State University	IL
Savannah State College*	GA
Seattle University	WA
Seattle Pacific University	WA
Shaw University	NC
Shorter College*	AR
Slippery Rock University of Pennsylvania	PA
Smith College	MA
Southern California College	CA
Southern College of Seventh-Day Adventists	TN
Southern Illinois Univ. at Carbondale	IL

*Telephone survey respondents.

Southern University and A & M Col at Baton Ro*	LA
Southern University Shreveport-Bossier City C*	LA
Southwest Missouri State University	MO
Southwest Texas State University	TX
Southwestern Oklahoma State University	OK
St Johns College	MD
Stanford University*	CA
Stephens College	MO
Sterling College	VT
Stevens Institute of Technology*	NJ
Stillman College*	AL
Suffolk County Community College Ammerman Cam	NY
Suny College at Brockport	NY
Suny College at Buffalo	NY
Suny College of Technology at Canton*	NY
Suny Health Science Center at Syracuse*	NY
Suny at Stony Brook	NY
Syracuse University Main Campus	NY
Tacoma Community College	WA
Talladega College*	AL
Tarleton State University	TX
Technical College of the Lowcountry	SC
Tennessee State University*	TN
Tennessee Technological University	TN
Texas A & I University	TX
Texas A & M University-Corpus Christi	TX
Texas Christian University	TX
Texas State Technical College-Sweetwater Camp	TX
Texas Womans University	TX
Thomas More College	KY
Transylvania University*	KY
Trinity Christian College	IL
Truckee Meadows Community College	NV
Tufts University	MA
Tulane University of Louisiana	LA
Tuskegee University	AL
The Union Institute	OH
University of Akron Main Campus*	OH
The University of Alabama	AL
University of Arkansas-Fayetteville	AR
University of Arkansas at Little Rock	AR
University of Baltimore	MD
University of California-Berkeley	CA
University of California-Los Angeles*	CA
University of California-San Diego	CA
University of California-Santa Cruz	CA
University of Central Arkansas	AR
University of Central Texas	TX
University of Colorado at Boulder	CO
University of Colorado Health Sciences Center	CO
University of Connecticut	CT
The University of Connecticut Sch of Med & De	CT
University of Dallas	TX
University of Delaware	DE
University of the District of Columbia*	DC
University of Florida	FL
University of Georgia	GA
University of Houston-Clear Lake	TX
University of Illinois Urbana/Champaign	IL
University of Iowa*	IA
University of Laverne*	CA
University of Maine at Farmington	ME
University of Maryland Baltimore County Campus*	MD
University of Maryland Baltimore Professional	MD
University of Maryland Eastern Shore*	MD
University of Massachusetts-Boston	MA
University of Michigan-Ann Arbor	MI
University of Miami	FL
University of Minnesota Morris*	MN
University of Minnesota-Twin Cities	MN
University of Mississippi Medical Center*	MS
University of Missouri-Columbia*	MO
University of Missouri-Rolla	MO
University of Montana	MT
University of Montevallo	AL
University of Nevada-Reno	NV
University of New Hampshire-Main Campus*	NH
University of Nebraska at Kearney	NE
University of Nebraska at Lincoln	NE
University of Nebraska Medical Center	NE
University of New Mexico-Main Campus	NM
University of North Carolina at Chapel Hill	NC
University of North Carolina at Greensboro*	NC
University of North Carolina at Wilmington	NC
University of North Dakota Main Campus	ND
University of North Texas	TX
University of Northern Colorado	CO
University of Northern Iowa	IA
University of Oklahoma Health Sciences Center	OK
University of Oklahoma Norman Campus	OK
Univ. of Pittsburgh-Pittsburgh Campus	PA
University of Pittsburgh Johnstown Campus*	PA
University of Rochester*	NY
University of Science and Arts of Oklahoma	OK
University of South Carolina at Aiken	SC
University of South Carolina - Columbia	SC
University of South Carolina at Spartanburg	SC
University of South Dakota	SD
University of South Florida	FL
University of Southern Maine	ME
University of Southern Mississippi	MS
University of Tennessee-Knoxville*	TN

*Telephone survey respondents.

University of Texas At El Paso	TX
University of Texas Medical Branch At Galvest	TX
University of Texas-Pan American	TX
University of Texas South-Western Med Ctr Dall	TX
University of Tulsa*	OK
University of Utah	UT
University of Virginia	VA
University of Washington	WA
The University of West Florida	FL
University of Wisconsin-Green Bay	WI
University of Wisconsin-Madison	WI
University of Wisconsin-Milwaukee	WI
University of Wisconsin-Platteville	WI
University of Wisconsin-Superior	WI
University of Wisconsin-Whitewater*	WI
University of Wyoming	WY
Utah State University	UT
Valley Forge Military College	PA
Vance-granville Community College	NC
Vanderbilt University	TN
Villanova University	PA
Virginia Commonwealth University	VA
Virginia Polytechnic Institute and State Univ	VA
Virginia State University	VA
Wake Forest University	NC
Washburn University of Topeka	KS
Washington College	MD
Washington State University	WA
Waukesha County Technical College	WI
Wayne State College	NE
Wayne State University	MI
Weber State University	UT
Wellesley College	MA
Wesleyan University	CT
West Virginia University	WV
Western Michigan University	MI
Western Montana College University of Montana*	MT
Wheaton College	IL
Wheeling Jesuit College*	WV
Whitman College	WA
Wichita State University	KS
Widener University Pennsylvania Campus	PA
William Paterson College	NJ
Williams College	MA
Wilson College	PA
Winston-Salem State University*	NC
Wisconsin Lutheran College	WI
Xavier University	OH
Yale University	CT
York College*	NE
Yosemite Community College District Office	CA

*Telephone survey respondents.

The Association of
Higher Education
Facilities Officers

1643 Prince Street
Alexandria, Virginia 22314-2818
703-684-1446

ISBN 0-913359-96-3